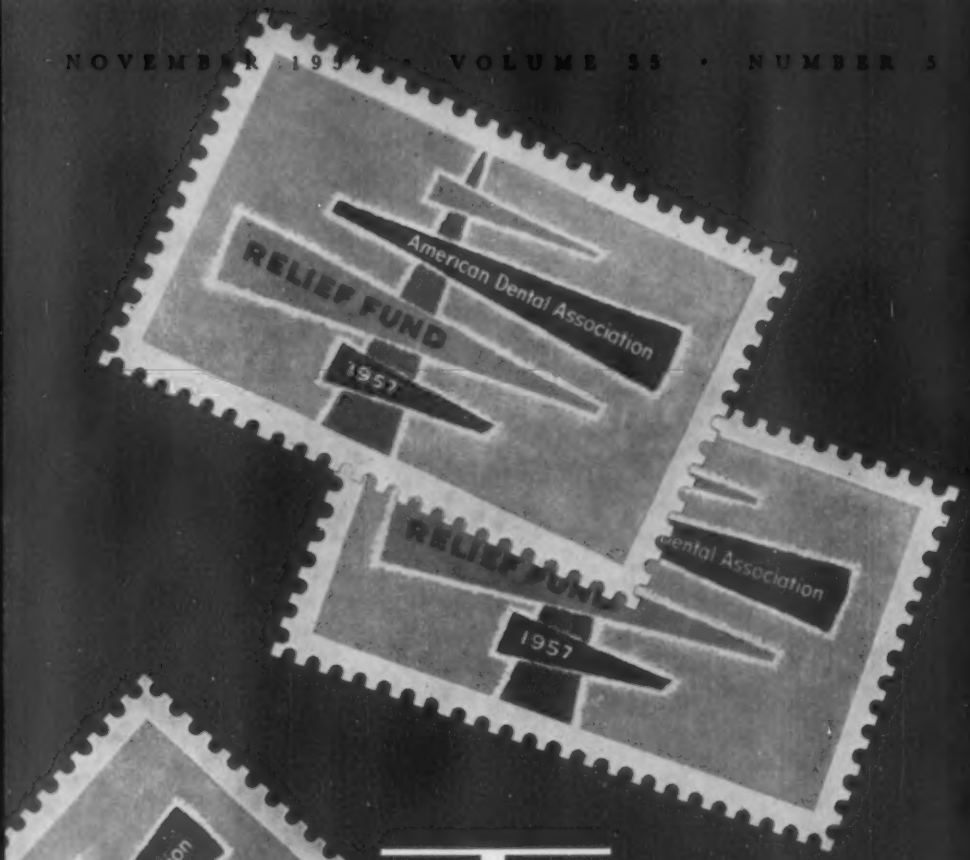
NOVEMBER 1957 • VOLUME 55 • NUMBER 5



THE Journal

OF THE AMERICAN DENTAL ASSOCIATION

TABLE OF CONTENTS ON BACK COVER

Experience with New Posterior Teeth Confirms Research Findings

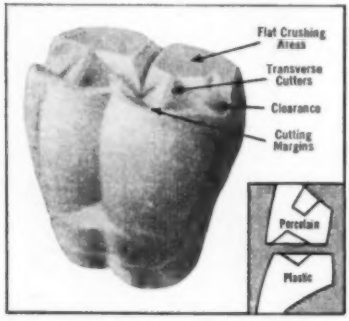
MYERSON AND SEARS DESIGN AND COMBINATION OF MATERIALS PROVE BENEFICIAL IN FULL RANGE OF CASES

Review

February 1956, Richard L. Myerson reported to the American Academy for Plastic Research in Dentistry his finding of dramatic reduction in wear of plastic teeth when opposed to properly designed porcelain teeth. November 1956, Victor H. Sears and Simon Myerson reported remarkable success in forty-eight clinical test cases. At the time of this writing, thousands of full dentures have been made with Myerson and Sears porcelain-plastic posterior teeth by the profession-at-large. There can be no doubt that this use has been extensive enough to be highly conclusive.

Results

Success has been reported on the most difficult as well as on normal cases. Equally important, no single case of failure or disappointment has been reported either voluntarily or upon solicitation.



Details of occlusal construction of new Myerson and Sears posterior teeth. Insert drawing shows how upper and lower teeth meet in one plane.

Conclusion

Many benefits can be derived from the use of Myerson and Sears posterior teeth. They are listed below.

I Benefits of Opposing Porcelain Teeth to Plastic

1. One tenth the loss due to wear compared to that experienced when opposing plastic teeth to plastic.
2. Less shock and resultant trauma and "clicking" than porcelain-to-porcelain.
3. Easier adaptation and adjustment due to lower teeth being plastic.
4. Increased masticating efficiency due to maintenance of sharpness by the upper teeth which are porcelain.

II Benefits of the Myerson and Sears Occlusal Design

1. Fulfilling the requirements essential to success in opposing porcelain to plastic.
2. Increased stability by directing the vertical force of mastication mainly to the lingual side.
3. Increased stability by directing most of the vertical force of mastication to the second bicuspid — first molar region.
4. Increased stability by absence of interdigitating cusps.
5. Easy set-up and articulation.

Whenever the above benefits are desired, the use of these new posterior teeth is indicated.

Available literature includes a booklet describing the new development, a technique by Dr. Victor H. Sears, and mould charts. Inquiries are welcomed. Address: MYERSON TOOTH CORPORATION, 90 Hamilton Street, Cambridge 39, Mass.

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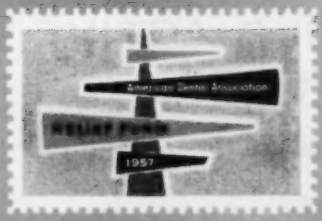

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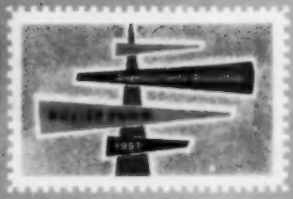

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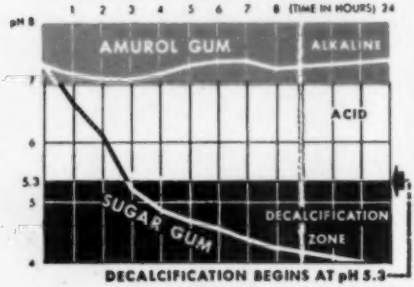

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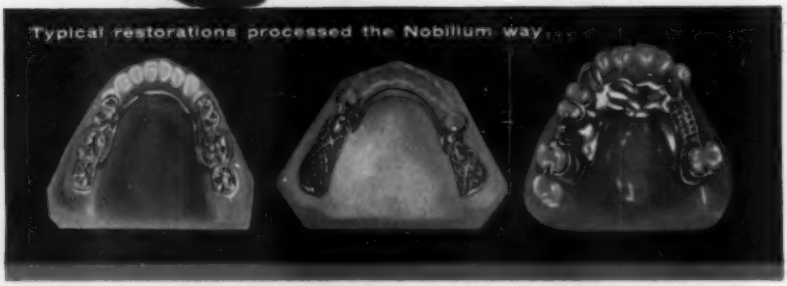

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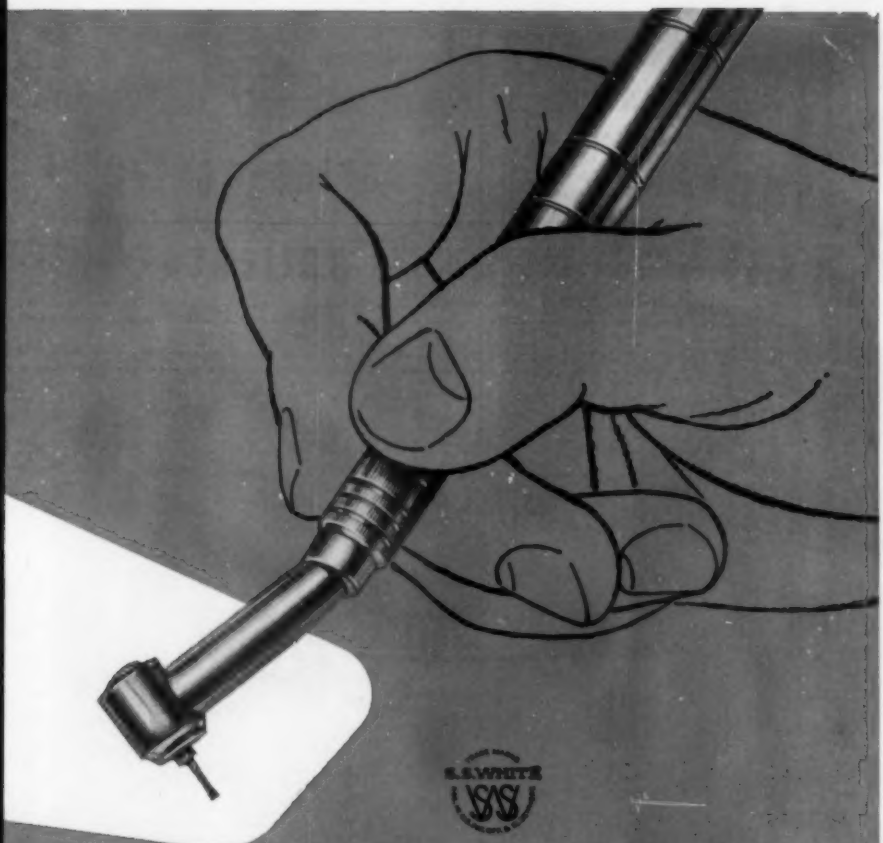

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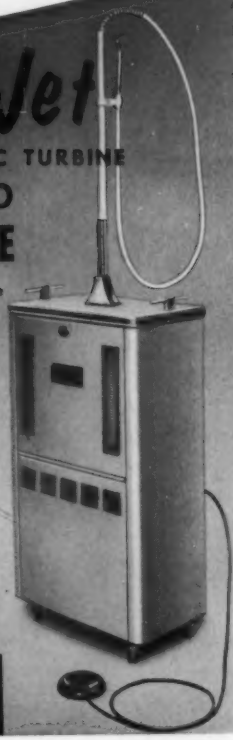

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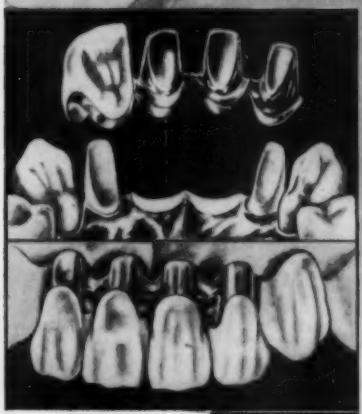

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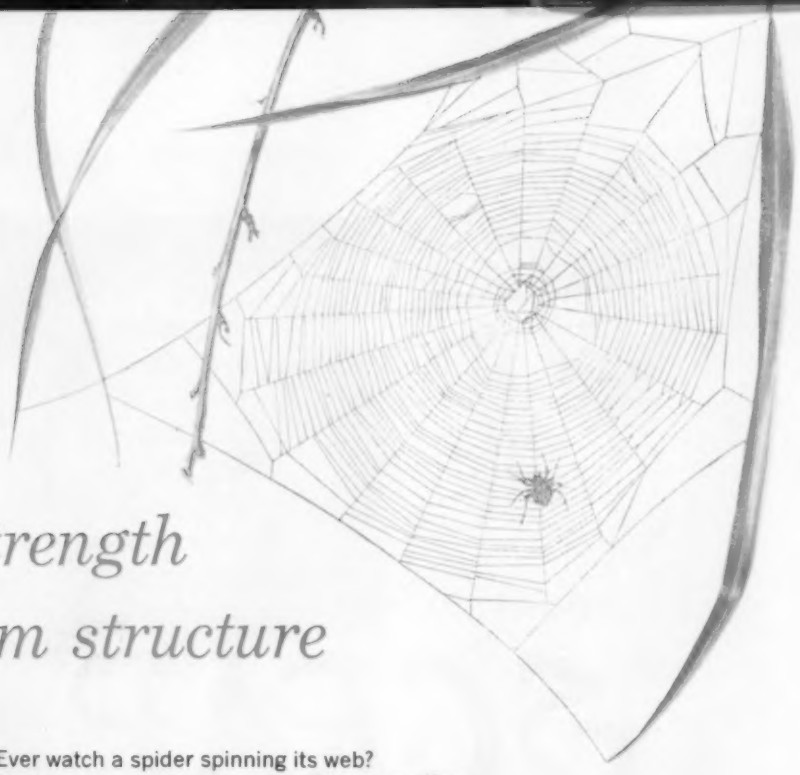

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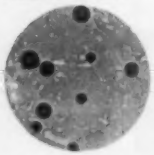

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THE DENTISTS' SUPPLY COMPANY OF N.Y.
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NOVEMBER 1957

THE Journal OF THE AMERICAN DENTAL ASSOCIATION

VOLUME 55 • NUMBER 5

The etiology and control of periodontal disease: introduction

In 1915, Black,[1] in his *Special Dental Pathology,* wrote, "Diseases of the peridental membrane beginning at the gingival margins are perhaps of all the diseases of the dental tissues, the least well understood." In 1921, Gottlieb advanced the idea of the epithelial attachment to the enamel of the crown as well as the cementum of the tooth root. Since then, Gottlieb, Orban, Kronfeld and others have contributed to a better understanding of the histopathology of the investing tissues of the teeth. Today, dentists are surfeited with textbooks, encyclopedic in character, describing structure and treatment programs for effective management of the disease conditions which involve the teeth and their supporting tissues.

The ideas described by the various authors of articles in this issue of THE JOURNAL clearly demonstrate the possibilities of the various treatment programs suggested. Theories formerly accepted are being discarded or modified as structure and function are better understood. It follows that an understanding based purely on the pathologic character of disease is inadequate, largely because it is terminal in character.

A physiologic rather than a pathologic approach to the problem has become necessary. The functional use of the teeth with healthy supporting tissues should be considered as being in harmony with jaw function and the related temporomandibular articulation and musculature. When disease is present, the whole mechanism should be considered, and measures should be taken to aid nature in recovery. In this way, sensible programs for the management of periodontal conditions can be achieved.

The evidence supplied in this issue of THE JOURNAL clearly illustrates the fact that periodontics, as such, has come of age and should be so considered by dental educators as well as practicing dentists.

1. Black, G. V. Special dental pathology. Chicago, Medico-Dental Publishing Co., 1915.

Periodontal research: problems related to practice

F. B. Wiebusch, D.D.S., Richmond, Va.

If the practitioner of general dentistry is to assist in retaining the dentition of his patients, it is necessary that he be a well informed student and practitioner and possess a fundamentally sound periodontal philosophy. The need for a general practitioner to possess a comprehensive understanding of periodontics has been emphasized frequently over the years.

If the teeth are to function at the physiological capacities for which they are intended, it is imperative that the periodontal constituents be maintained in a state of health. Because the greatest number of dental patients are seen by dentists in general practice, the major responsibility for rendering this type of dental service rests with this group. Periodontal care involves not only the prevention and treatment of periodontal disease; it also includes the maintenance and reevaluation of the previously treated periodontal patient.

To meet these demands, the practitioner of general dentistry must be well qualified as a periodontist and must understand the anatomy, histology, and physiology of the healthy periodontium. Until this knowledge has been acquired, it is difficult, if not impossible, for him to be aware of existing pathologic changes. Although it is important for the dentist to identify and correct gross pathosis, it may be even more important for him to have the ability to recognize discrete, early, pathologic lesions.

The advances made in the periodontal field within the past 75 years have been sizeable. Although aware of past accomplishments, the periodontists realize that much investigative work remains to be done in this and related fields. If the dental profession is to grow, a multitude of current questions must be solved. Perhaps the brighest hope for the solution to these problems lies in the field of research. Only through investigative procedures can the profession be furnished a yardstick with which to evaluate the merits of newly presented theories and therapeutic measures. The provision of such a measuring device is a joint responsibility that should be accepted by the men in the field of research and by those in dental practice.

It is impossible in this paper to comment on the countless number of periodontal problems requiring additional study; therefore, only a few will be discussed.

EPITHELIAL ATTACHMENT

Although considerable information pertaining to the periodontium is available, speculation, disagreement and confusion continue to exist regarding some aspects of the physiology and histology of the comprising constituents.[1] With reference to the basic sciences as related to the

Associate professor, chairman of the department of oral diagnosis and therapeutics, Medical College of Virginia, School of Dentistry.

1. Baume, L. J. Observations concerning the histogenesis of the epithelial attachment. J. Periodont. 23:71 April 1952.

epithelial attachment, there has been considerable controversy.[2] For years, one popular theory has been that the attachment of the gingival epithelium to the cementum of the tooth is a firm, organic union comprised of tonofibrils inserting into cementum.[3] In more recent years, however, doubts have arisen over the firmness of this union, and it has been suggested that if a union does exist, it may be a weak one. A third idea, which is related to the role played by the secondary cuticle in helping to cement the gingival epithelium to the surface of the tooth, is not clearly understood.[3] Waerhaug,[4] who disagrees with these several theories, has presented interesting material which indicates that the "so-called" epithelial attachment is not attached; instead, the gingival tissue appears to be a cuff of tissue closely adapted to tooth structure.

There is little agreement regarding the essential nature of the epithelial attachment; therefore, debate ensues. Since there is controversy regarding a subject as basic as this, the need for continued periodontal research is clear.

CEMENTUM

Within recent years, the ideas which at one time were presented as facts were later proved false. New information frequently makes it necessary to alter thinking. The physiology of cementum is an example of an entity which requires additional consideration. For some years the writings on cementum have emphasized that deposition of this hard tissue takes place continually throughout life.[3] More current theories suggest that continuous deposition of cementum on the root surface may not be a normal, physiologic function and should perhaps be considered an atypical observation. Which of these two theories is valid, of course, is open to debate. The solution to this problem may be offered after the findings provided by careful analytical research have been evaluated.

EPITHELIAL RESTS OF MALASSEZ

The epithelial rests of Malassez, which are found in the periodontal membrane as remnants of Hertwig's epithelial root sheath, have been thought to serve no useful function. Unless a specific purpose is served, Orban[5] has suggested that the vital retention of this epithelial network throughout the lifetime of the individual is difficult to understand. Since cementum formation does not take place until the root sheath breaks up,[6] which allows connective tissue proliferation to occur between the surface of the dentin and epithelium, these epithelial remnants might possibly be the source of stimulation for the formation of cementoblasts and cementum. If cementum is deposited continuously throughout the lifetime of the individual, could these islands of epithelial tissue be responsible for this type of function?

In some instances of periodontosis, it has been observed that large numbers of epithelial rests are found in the periodontal membrane. It has been proposed that these strands represent a futile attempt to promote and encourage cemental repair through cementoblastic action. Observations and suppositions such as these arouse the curiosity of the avid student of periodontology. Where but in research do solutions to these problems lie?

INFLAMMATION

As new information is obtained in the basic sciences, knowledge regarding periodontology is expanded as well. In the field

2. Goldman, H. M. Periodontia, ed. 3. St. Louis, C. V. Mosby Co., 1953.

3. Orban, B. Oral histology and embryology, ed. 3. St. Louis, C. V. Mosby Co., 1953.

4. Waerhaug, J. The gingival pocket. Odont. Tskr. 60:(supp. 1) 1952.

5. Orban, B. Epithelial network in periodontal membrane. J.A.D.A. 44:632 June 1952.

6. Gottlieb, B. Biology of the cementum. J. Periodont. 13:13 Jan. 1942.

of pathology alone, Menkin's[7,8] treatises on the dynamics of inflammation have improved immeasurably the understanding of periodontal disease. Because the majority of periodontal manifestations exist as inflammatory entities, Menkin's work has added greatly to the understanding of periodontal disease. Without detracting from this researcher's findings, it still can be said that the entire story of inflammation has not been told. An example is the fact that the functions of two chronic inflammatory cells, the eosinophil and basophil, are not understood completely.[9] Whether or not the basophil serves as the source of heparin, preventing the formation of large blood clots in regions of inflammation, is as much a point of debate as is the question as to whether antihistamine is produced by the eosinophil.

Inflammatory changes observed at a clinical level oftentimes are referred to as mild, moderate, or severe, but these descriptive terms are relative. The need for analyzing the basic patterns of these inflammatory regions is clear. Possibly at some future date histochemical analysis of the tissues involved in inflammatory alterations may provide not only the diagnosis of the pathologic process but may dictate the treatment as well.

Perhaps when these and additional questions relating to inflammatory reactions are answered, the understanding and treatment of periodontal disease will be altered and improved. Again, research must furnish the answers.

PERIODONTAL ETIOLOGY

One of the present-day theories regarding periodontology suggests that many factors are responsible for periodontal disease.[10] Periodontal pathosis is probably never caused by a single etiologic factor; rather, a combination of causes which both lower tissue resistance and subsequently act on these debilitated tissues is responsible for the periodontal lesion. Miller[11] has classified the etiologic components of periodontal disease into three broad factors—dysfunctional, irritational, and systemic. This classification has promoted insight into periodontics; however, it does not imply necessarily that the etiology is completely understood. Although this broad classification of etiologic factors may be complete in itself, the countless vague details of comprising subdivisions indicate that additional study is required if a broader insight is to be had into this complex, intricate and many faceted problem of periodontal etiology. The statement that a great deal is known about periodontology and yet there is still much that needs to be understood applies all too well to this particular phase of the subject. Perhaps in no other aspect of periodontics does clinical research have greater opportunity for exploitation than in this singularly important area.

CALCULUS

The importance of dysfunctional and irritational factors in the causation of periodontal disease must not be minimized; however, only one important local factor which needs continued investigation—calculus—will be discussed here. Of the many causes of periodontal disease, calcareous deposits undoubtedly remain one of the most serious offenders. Although an attempt is made to explain calculus formation on bacterial[12] and physicochemical[13] grounds, it is evident that the

7. Menkin, V. Dynamics of inflammation. New York, Macmillan Co., 1940.

8. Menkin, V. Newer concepts of inflammation. Springfield, Ill., Charles C Thomas, 1950.

9. Robinson, H. B. G. Pathology of periodontal diseases. J.A.D.A. 44:636 June 1952.

10. Miller, S. C.; Okun, M. N., and Yudkoff, I. Periodontia, etiology, diagnosis and treatment. J. Canad. D.A. 21:447 Aug. 1955.

11. Miller, S. C. Textbook of periodontia, ed. 3. Philadelphia, Blakiston Co., 1950.

12. Bibby, B. G. Formation of salivary calculus. D. Cosmos 77:668 July 1935.

13. Kirk, E. C. American textbook of operative dentistry, ed 4. Philadelphia, Lea & Febiger, 1911.

understanding of these bizarre mineral depositions is scanty. Admittedly, this particular type of tooth accretion has long been identified as a major cause of periodontal disease, but over the years little has been learned about its biochemistry. When the field of research aids dentistry in understanding the formation, control, and prevention of calcareous deposits, the profession undoubtedly will make one of its greatest advances.

SYSTEMIC FACTORS

One of the largest areas for improvement of understanding in the periodontal field lies in the systemic diseases. Alterations in normal physiologic processes apparently predispose an individual to disease by lowering the capacity for tissue resistance. Although this statement may be true, its meaning is cloaked in generalities. Such a declaration appears safe because it is of sufficient breadth to offer little opportunity for debate.

For some years dentistry has readily admitted that the oral cavity cannot be separated from the rest of the body. Modern dentistry no longer attempts to treat a tooth, a periodontal pocket or a region of periapical pathosis as such. Since these lesions are a part of the individual, contemporary thinking in periodontology recognizes the need for therapy being directed toward the patient with a carious lesion, periodontal disease, or region of periapical change.[11] The oral cavity is a part of the whole patient, and anything which affects the mouth can also affect other parts of the body. The corollary of this statement is equally true—factors affecting the body have the potential of affecting the oral cavity as well. After all, the blood supply to the periodontium is subsequently transported to other parts of the body and vice versa.

There is no one laboratory test presently available to determine a relation between periodontal and systemic diseases. All too often, patients with periodontal problems are referred for complete physical examinations and laboratory evaluations which disclose only negative or minimal findings. Without overlooking the possibility that subclinical systemic alterations may be present, there is little encouragement currently afforded the diagnostician to render such a diagnosis.[14]

Although it is not always wise to categorize patients, assuredly two specific types of periodontal patients are observed frequently. One has definite local problems and minimal regions of periodontal disease, whereas the other reveals major periodontal destruction accompanied by few, almost negligible, local factors. Often medical examination discloses no systemic deviation in this latter patient. Such negative observations indicate that the causative factors in periodontal disease are not always identifiable. It may be that the difference in these two patients is one of tissue susceptibility, resistance, and repair, influenced by the general health of the individual. Once more, research and investigative procedures must furnish the answer to this problem.

Among systemic factors, the endocrine system is one of the most important because of its relation to all bodily processes.[11] The thyroid gland affects tooth eruption, the pituitary gland governs oral arch form, the parathyroid glands relate to calcium and phosphorus metabolism, the pancreas aids sugar metabolism, the adrenal glands play an important role in Selye's[15] general adaptation syndrome of stress, and the gonads influence epithelial changes—these are but a few of the factors in the physiology of the endocrine system which have been described reasonably satisfactorily. Undoubtedly, the periodontium is influenced by the functions of the endocrine glands; however, knowledge as to the exact relation of endocrine imbalances to periodontal dis-

14. Syrop, H. Personal communication.
15. Selye, H. Story of the adaptation syndrome. Montreal, Acta, Inc., 1952.

ease is too ill defined for the critical student of oral medicine. Not until the correlation of such factors is understood more fully can the scientific worker be satisfied with the many far-reaching theories regarding the role of the endocrine system.

It has been stated that psychosomatics is a new field that should be studied by members of the health professions. Early investigation has indicated that there may be more than a casual relation between personality types, emotional problems, habit patterns, and periodontal disease.[11] Although the existence of a reversible relationship between the mind and the body may be recognized, little is known of the actual mechanics involved. This entire subject is of such importance and scope that researchers should have the opportunity to explore this field.

OTHER AREAS REQUIRING ADDITIONAL STUDY

So great is the need for research in periodontics that it is virtually impossible to enumerate any area that does not require further study. Evaluation of new drugs and current therapeutic technics, diet and nutrition as related to periodontal health and disease, the precise physiology of wound healing, degenerative periodontal disease, reevaluation and substantiation of past findings in the basic sciences, the relation of the oral bacterial flora to periodontal disease, reaffirmation that stage four[3] of passive tooth eruption occurs as a physiologic process, and more detailed information regarding collagen formation and collagen diseases are a few of the topics requiring continued investigation at both clinical and theoretical levels of research.

COMMENT

If the general practitioner is to accept responsibility for rendering improved periodontal care, many perplexing questions must be answered through research. A part of this responsibility must be shared by the practitioner. Not only will the experience obtained from operative procedures enable the clinician to improve his technics and broaden his knowledge, it will clarify his thinking as well. The daily chairside observations merit special consideration. A knowledge of the range of variations existing for healthy tissues, an understanding of the behavior patterns of oral disease entities, and an evaluation of therapeutic measures represent a triad of clinical criteria important to the field of research. Only through the combined efforts of clinical and basic science research groups can the periodontal problems of today be resolved.

Educated Men • It is one of the puzzles of belonging to the company of educated men that you can never in an absolute sense be quite sure you do belong. For you as an individual there will always be another door, still closed, leading to still another, still more secret room. If as an individual you ever cease to perceive that there is another such door, it is even probable that you will then cease to belong in the company of educated men. *John E. Burchard.*

Reduction of hamster periodontal disease by sodium fluoride and sodium monofluorophosphate in drinking water

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Harold C. Hodge,‡ Ph.D., Rochester, N. Y., and
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Much attention has been devoted to the use of fluoride in reducing tooth decay; however, practically none has been given to its role in periodontal disease.

Shourie, Hein and Hodge[1] found sodium fluoride (NaF) and sodium monofluorophosphate (Na_2FPO_3) at 40 ppm of fluorine in the drinking water to be equally effective in reducing tooth decay in the hamster. To determine the effect of these compounds on periodontal disease, the stripped jaws of these animals were scored for periodontal disease using the technic described by Costich.[2]

METHOD

The stripped jaws of 56 hamsters (30 females and 26 males) 113 days of age that had been divided into three littermate groups and raised on a caries-producing diet were scored. The diet consisted of 30 per cent whole wheat flour, 30 per cent whole powdered milk, 20 per cent cornstarch, 15 per cent confectioner's sugar, 4 per cent alfalfa and 1 per cent sodium chloride.

Group 1 was the control group receiving distilled water, Group 2 received 40 ppm fluorine as sodium fluoride in distilled water and Group 3 received 40 ppm fluorine as sodium monofluorophosphate in distilled water. Both food and drinking solutions were given *ad libitum*.

RESULTS AND DISCUSSION

There was a statistically significant decrease in the alveolar crest recession in the male animals receiving sodium fluoride and sodium monofluorophosphate, as shown in the table. The females received no protection. The weight gains for the six groups were comparable.

The existence of a sex difference in incidence of hamster caries has been well established, but has not been explained.

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1. Shourie, K. L.; Hein, J. W., and Hodge, H. C. Preliminary studies of the caries inhibiting potential and acute toxicity of sodium monofluorophosphate. J. D. Res. 29:529 Aug. 1950.

2. Costich, E. R. Quantitative evaluation of the effect of copper on alveolar bone loss in the Syrian hamster. J. Periodont. 26:301 Oct. 1955.

Table • Statistical analysis of alveolar crest bone loss in hamsters drinking distilled water containing 40 ppm F as NaF and 40 ppm F as Na_2FPO_3

Sex	Treatment	No. of animals	Mean score	Standard deviation
M	Control	8	870	580
M	NaF	9	350	200
M	Na_2FPO_3	9	300	100
F	Control	10	740	510
F	NaF	10	680	210
F	Na_2FPO_3	10	520	250

	Critical ratio
Control male versus control female	0.50
Control male versus NaF male	2.42
Control male versus Na_2FPO_3 male	2.76
Control female versus NaF female	0.35
Control female versus Na_2FPO_3 female	1.21

$$\text{Critical ratio} = CR = \frac{m_1 - m_2}{\sqrt{\frac{\sigma_1}{n_1} \quad \frac{\sigma_2}{n_2}}}$$

m = mean
n = number of degrees of freedom
σ = standard deviation
CR > 2.00 indicates significance

A similar sex difference apparently exists in incidence of alveolar crest recession; the males show reduced alveolar bone loss as well as fewer cavities when given fluorides. The reason for this protection is unknown. There is speculation, however, on the possibility of hormonal influence. Keyes[3] and Hein[4] showed that castration will reduce the incidence of caries in the male, but ovarectomy does not change caries incidence in the female. The effects, if any, on the alveolar crest were not recorded.

There are reasons to believe that fluoride may be beneficial in reducing the severity of the periodontal problem. The importance of bacteria and bacterial products in the initiation and progress of the disease are well known. Bibby and Van Kesteren[5] showed that 1 ppm of fluoride brought about sufficient change in bacterial metabolism to reduce acid formation. Changes in other bacterial products, as yet unmeasured, may also occur.

The importance of a positive bone factor has been generally accepted. McClendon and Gershon-Cohen[6] showed, by their studies with fluoride-free diets, the importance of fluoride in maintaining good supporting bone for the teeth of rats.

Lukomsky[7] advocated the use of sodium fluoride, 5 drops of a 1 per cent solution three times a day—about 7.5 mg. per day—to treat osteomyelitis and periodontal disease. He suggested that the fluoride would stimulate calcification around the lesions, form a more resistant bone structure, and inhibit cellular enzyme systems associated with tissue breakdown. In 500 instances of gingivitis and progressive alveolar atrophy treated by his method, he reported that the teeth tightened and masticatory efficiency increased, while inflammation decreased and disappeared. No confirmation of his clinical study has appeared.

Some of Lukomsky's[7] assumptions are attractive. Three possible factors in the effects of fluoride on alveolar bone are as follows:

1. Since fluoride reduces the solubility of hard tissues in acid, the fluoride may reduce the resorbability of the alveolar bone.

2. In low concentrations (10^{-6} molar), fluoride inhibits enolase; perhaps the fluoride may poison some unidentified bacterial enzyme systems that attack the tissues adjacent to the periodontal pocket.

3. Keyes, P. H. Dental caries in the Syrian hamster. III. The effect of gonadectomy on caries activity and body growth. New York J. Den. 18:172 May 1948.

4. Hein, J. W. Experimental studies of oral health: evaluation of certain water-soluble chlorophyll derivatives. Thesis, University of Rochester, 1952.

5. Bibby, B. J., and Van Kesteren, M. The effect of fluorine on mouth bacteria. J. D. Res. 19:391 Aug. 1940.

6. McClendon, J. F., and Gershon-Cohen, J. Effect of fluorine-free food on dental and periodontal structures as revealed by roentgen studies. Am. J. Roentgenol. 71:1017 June 1954.

7. Lukomsky, E. H. Fluorine therapy for exposed dentin and alveolar atrophy. J. D. Res. 20:649 Dec. 1941.

3. Because the parallel sex difference found in regard to the effect of fluoride on caries is similar to that found in regard to alveolar crest recession, it is suggested that fluorides may influence some endocrine system.

The implication that fluorine ingestion may have a preventive influence on periodontal disease is of great interest. Additional laboratory and clinical studies should be done.

SUMMARY

Fluorine as sodium fluoride or as sodium monofluorophosphate, when given in the drinking water at 40 ppm, reduces the incidence of alveolar crest resorption in the male hamster.

Surgical treatment of periodontal disease

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A proper discussion of surgery in the treatment of periodontal disease depends on the establishment of a point of view or on the adherence to a particular school of thought.

There are some practitioners who feel that cutting away gingival tissue cures periodontal disease. There are others who think that tissue should be cut away first, and then, if they find it to be expedient, other procedures, such as scaling, curettage, brushing and equilibration of the occlusion should be tried. In both these instances it is important to notice that the operators are not treating the cause but rather the effects of the disease. To be effective periodontal treatment must concern itself primarily with the removal of the causative factors.

Surgery always is dreaded by every patient. They will undergo it if they are told it is necessary, but they do not like it. There are many persons in whom psychosomatic effects occur because of such measures, and there are many instances in which a person's socioeconomic status may be impaired because of esthetically poor results after the removal of tissues. Horizontal food impaction is another factor that must be considered a disadvantage of large-scale tissue reduction.

These preliminary remarks should not be misconstrued. The use of surgical technics is not condemned; only the time at which they are instituted is open to criticism.

The instance of a young epileptic being given diphenylhydantoin (Dilantin) sodium who shows a proliferative type of gingiva which covers the incisal edges of the teeth is a problem. It has been found that this overgrowth of tissue often can be reduced to normal without resorting to surgical removal and without discontinuance of the medication. When it is realized that results such as this can be obtained with so-called conservative treatment, why do dentists rush to use the

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scalpel? Certainly, the patient does not mind if conservative treatment takes a little longer, and, from the dentist's point of view, the success is very gratifying.

CONSIDERATIONS IN SURGERY

Within the scope of periodontal treatment, there are two basic types of surgical procedures, the removal of tissue, often called tissue reduction or gingivectomy or gingivoplasty, and the establishment of accessibility for deep curettage or the removal of infected granulation tissue or of bone, with subsequent replacement of the original tissue.

It is not necessary to go into detail about the various surgical technics, but the main principles in the two basic types of surgery will be reviewed. Of greater importance is understanding the problem at hand, together with a few fundamentals as they pertain to periodontal surgery. As in any other type of surgery, the basic principles of asepsis should be observed.

Removal of Tissue • The minimum amount of tissue that will make the necessary correction should be removed and esthetics should always be an important consideration.

In the removal of tissue for any periodontal purpose, markings should first be made to determine the desired line of incision. When cutting the tissue, the blade should be held at such an angle as to leave a finishing line with a feathered edge and not a broad, blunt base. The incision should, if possible, be a single stroke. The incision, at the beginning point, should not include the free edge of the gingival margin so as to maintain tissue tension. This may be incised later. If the gingival edge obtained does not suit the operator, scraping with a scalpel blade or abrasive stones may be used for further contouring of the tissue.

Establishment of Accessibility • In establishing accessibility, if there is a deep, narrow pocket at the labial, or lingual aspect of a tooth, a simple gingival incision that does not include the gingival margin may be used. This buttonhole incision gives better access to the deeper portion of the pocket.

For deep, wide pockets, a semilunar flap may be used. With this type of flap, the incision should curve toward the apex of the tooth. The incision should be wide enough to extend beyond the area of involvement. When the tissue is sutured back into place, the marginal gingiva will not be drawn upward and retracted in the healing process. This method permits good visualization and good access, and the esthetic result is excellent.

For deep, wide pockets, a complete flap may be used. With this type of flap, the entire gingival margin is reflected to the desired depth. The incision to the gingival edge should be made on good healthy bone at the middle of an interdental papilla to prevent a poor esthetic result at the point of incision. It has been shown that incision or injury to the gingival margin will result in recession at the point of insult. Therefore, by transecting the interdental papilla first and then bisecting it for the flap incision, the lingual portion of the papilla will serve as a base for reattachment of the tissue and the recession will not be too apparent. Whether one or two incisions are used will depend on the judgment of the surgeon. Accessibility and visibility are good with this type of flap, and large areas may be operated on at one sitting.

After surgery, packs of one type or another may or may not be used at the discretion of the operator. Sutures, when made, should be tied with the knot away from the line of incision. Initial incisions should always be made away from the involved regions and on healthy bone to prevent dipping in of the healing tissues.

Surgical instruments of many shapes have been designed. Some of these may be used to advantage. The scalpel with its blades of many shapes is still a very good

instrument and can be used almost universally. All surgical instruments should be kept sharp.

There are instances in which surgery is indicated as an emergency procedure in periodontal disturbances, such as acute periodontal abscesses or deep suppurating pockets. In these instances it may be best for the dentist to relieve the acute condition first and then institute routine conservative treatment, with the thought in mind always that he is trying to eliminate the causative factors.

In most of the patients who present themselves for periodontal treatment, surgery should be delayed until toward the end of treatment and should be used as an adjunct to treatment rather than as a specific treatment itself.

1749 Grand Concourse

Diagnosis and prognosis in periodontal disease

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It is a continuing source of wonder to those interested in periodontology that at this late date there are still so many dentists to whom this subject remains unfamiliar. Witness to this is the increasing number of patients who present themselves for periodontal therapy with advanced lesions and little or no awareness of their conditions in spite of regular dental visits.

On learning of the diagnosis, these patients inquire, ofttimes with noticeable resentment, how it is possible for the condition to have reached such an advanced stage without the dentist's having previous knowledge. This is a most difficult question for the periodontist to answer. A professor once said, "It is excusable to see a lesion and be unable to label it—we may find someone who can; but to fail to see it at all is an unforgivable sin."

It is apparent that periodontal disease must be recognized earlier if patients are to receive proper preventive care and avoid the development of an advanced condition, which accounts for over 50 per cent of all teeth lost.[1]

ROENTGENOGRAPHIC SIGNS

There are many signs which lead to the detection of early periodontal disease, but it is necessary to "think periodontally" in order to see them. As the trained eye scans a roentgenographic series, variations from the normal soon become apparent. Changes in the alveolar crest are to be seen early in the disease.[1] The cortical plate or lamina dura disappears, and the area immediately below appears radiolucent. Thickening of the periodontal space as a result of trauma first appears close to the marginal crests and continues, involving the entire periodontal membrane.

Variation in the height of labial and lingual supporting bone is often missed unless the radiodensity is observed carefully. A line which indicates the level at

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1. Miller, S. C. Textbook of periodontia (oral medicine), ed. 3. Philadelphia, Blakiston Co., 1950.

which both plates of bone and the root exist may be seen crossing the root; superior to this level one plate and root can be seen. Which level is higher, buccal or lingual, can be determined only by probing.

The level of the crest in itself is an important indication of the degree of periodontal involvement. Normally, the interproximal crest is found near the cementoenamel junction, perhaps 1 mm. below. Examination of individual roentgenograms will show variations from this norm throughout a series.

CLINICAL SIGNS

Perhaps the one most reliable and easily discernible clinical sign of periodontal disease is mobility. The ends of rigid instruments should be used for testing, with the tooth being rocked between them. Testing with the fingers is misleading, as the soft tissue of the finger tips is depressible and they give a false impression of movement.

Mobility can be classified in degrees as no. 1, no. 2 and no. 3. If movement of the slightest amount greater than normal is detected, it is classified as no. 1. No. 2 mobility is that amount of movement which allows the crown to move 1 mm. in any direction from normal. No. 3 mobility permits the tooth to move more than 1 mm. in any direction and also its alveolus to be rotated or depressed.

It is interesting to note that the amount of bone present around a tooth as observed in the roentgenograms may have no relation to the degree of mobility. The periodontal space and the type of bone present, however, influence mobility to a great degree. This point will be discussed further in the section, "Prognosis."

Other readily observable signs of periodontal pathosis should be considered.[2] Variation from the normal pink color of the gingiva is usually a sign that disease is present. An early sign is marginal redness due to traumatic occlusion, subgingival calculus or dietary deficiency. Changes in the gingival form can be diagnosed readily, but, as was mentioned previously, they must be looked for to be seen. Unless the eye focuses on soft tissue, clues will be missed. Conditions that may be present are Stillman's clefts, McCall's festoons, recession, gingival enlargements due to many etiologic factors and the typical blunting at the interproximal crest in necrotic gingivitis among many others. Suppuration is a sign of a more advanced disease, and pus can be elicited by "milking" the gingiva, that is, exerting a stroking pressure on the gingiva in an apical to an occlusal direction.

Occlusal trauma is a most common etiologic factor in periodontal disease.[3] Frequently, esthetically poor anterior alignment will give a clue to the presence of malocclusion. An overly long anterior tooth or one which protrudes and diastemas of recent origin—such simple signs as these indicate a need for investigation.

There are other signs and symptoms of significance, but they are passed over perhaps lightly because their significance is not understood. Such complaints as "itching" of the gingiva, gingival hemorrhage, either spontaneous or from the pressure of eating or brushing, bad taste, fetid odor and food impaction should not be included in the group of symptoms for which only the use of saline mouthwash should be advised. Each of these symptoms may be indicative of periodontal disease, and their presence demands further investigation. The variations from the normal seen in this one field of dentistry are myriad. At any time the dentist can observe changes not previously seen in his experience. It is necessary to learn the significance of each of these variations so that the next time they are seen they

2. Box, H. K. Treatment of periodontal pocket. Toronto, Canada, University of Toronto Press, 1928.

3. Sorrin, S., and Simring, M. Treatment of periodontal disease. J. D. Med. 10:3 Jan. 1955.

will be recognized for what they are and what they mean.[4]

PROGNOSIS

After the dentist has determined that periodontal disease is present, the next problem is to determine the extent of involvement, the expected results of treatment and the service the teeth can be expected to give in the future. Teeth with periodontal involvement can be classified as follows: good—the tooth can be saved, fair—the tooth has a good chance of being saved, questionable—results of treatment must first be observed before the fate of the tooth can be determined, poor—the chances for retaining the tooth are small and hopeless—the tooth cannot be saved, and it should be extracted as soon as is practicable.

The following factors should be considered in determining prognosis:

1. Extent of the pocket. The presence of pockets which involve the trifurcations of the upper molars usually means that these teeth cannot be expected to be serviceable. The regions between the roots are inaccessible to the patient for cleansing and to the dentist for treatment. These pockets usually progress to increased alveolar loss involving the adjacent teeth which are ofttimes sound. Lower molars in which involvement extends to the bifurcations have a better prognosis if their roots are spread sufficiently to allow instrumentation and if the mobility is not excessive.[5] Deep pockets close to the apex of the tooth also render the prognosis of the tooth hopeless.

2. Alveolar bone support. The amount, distribution and type of bone are important determining factors in prognosis. At least one half the bone must remain around a tooth for the prognosis to be considered favorable, and this bone should be favorably distributed. The type of bone will have a direct bearing in relation to the amount of bone remaining. Bone has variable density. Bone with large medullary spaces and scanty trabeculation gives less support than bone with densely woven structure. With recognition of variation in the type of supporting bone, the dentist can anticipate tooth retention in one instance with a given amount of bone and failure in another with even more alveolar support.

S. C. Miller's classification of bone types is a useful guide in determining the rate of progress of disease as well as the approximate chronicity of the condition and its future outlook.[1]

In normal alveolar support, the first class, the alveolar process is of even density from the crest to the inferior border of the mandible. The mesh-like pattern is relatively constant, with the slight variations inherent in the anatomy of the jaws. The lamina dura is intact, covering the alveolar crest and continuing down and around each tooth to form the border of the periodontal space. The normal periodontal space, containing the periodontal membrane, is so small that frequently it is not visible on a roentgenogram, the tooth blending with the surrounding alveolar process.

Marginal thickening of the periodontal membrane is the second class. This widening of the periodontal space at the crest adjacent to the tooth is one of the earliest signs of trouble. Untreated, it will go on to produce clinically apparent periodontal disease within a few years.

In arrested bone destruction, the third class, examination of a roentgenogram reveals the crest to be at a level below the normal. This level may vary greatly, but in a patient in whom the condition is controlled the density will be even and new lamina dura may be present.

In slow bone destruction, the fourth

4. Goldman, H. M. Periodontia: a study of histology, physiology, and pathology of periodontium and treatment of its diseases. St. Louis, C. V. Mosby Co., 1953.

5. Gottlieb, B., and Orban, B. Biology and pathology of tooth and its supporting mechanism. New York, Macmillan Co., 1938.

class, the crest level may vary as in arrested bone destruction, but it will be noted that the lamina dura is absent on the roentgenogram and there is a radiolucency of the process extending a short distance apically, beyond which the bone appears to be normal.

In rapid bone destruction, the fifth class, as in the previous class, "slow bone destruction," the lamina dura is absent and a radiolucency of the interseptal crest can be observed, but now the penetration is deeper into the alveolar process. The greater the depth of penetration of this dark area as seen on a roentgenogram, the more rapid the rate of destruction.

3. Mobility. The importance of mobility as a diagnostic sign has been discussed. The prognosis for teeth which evidence no. 3 mobility generally must be considered hopeless, and the tooth should be extracted. During treatment it would be good to consider methods of stabilizing teeth that show mobility. Alveolar bone will not regenerate in the presence of excessive tooth movement any more than a fractured long bone will heal without immobilization.

4. The number of teeth remaining. A sufficient number of teeth must remain to carry the expected load adequately. Joining as many isolated teeth as possible around the arch by splinting procedures will greatly enhance the prognosis. With small numbers of teeth remaining at a distance from each other, the chances for serviceability become much less.[6]

5. Distribution of remaining teeth. Too often it is necessary to extract sound and otherwise serviceable teeth because their positions in the arch are unfavorable for their being abutments. A few teeth, positioned unilaterally, or four or five incisors do not lend themselves to being useful supports because of the leverage factor.[6]

6. Age. Paradoxically, in the treatment of periodontal disease, the younger the patient the poorer the prognosis. Given two patients with periodontal involvement of the same degree, one young and one older, it is logical to assume that the younger patient has far less resistance since equal damage has occurred in a shorter period. It follows then that, in a patient with weak resistance, response to treatment is more difficult to obtain. The converse is true in the older patient.[1]

7. Health. A more conservative appraisal of prognosis is necessary when the patient suffers from poor health. Such conditions as diabetes, tuberculosis, blood dyscrasias and gastrointestinal complications delay response to treatment. Teeth for which the prognosis is questionable and which even remotely could be considered foci of infection should be extracted.

Not too many years ago a manufacturer introduced a product which he purported would cure periodontal disease by simple application of the drug to the gingiva. The treatment received much notice for a short time until its effects proved to be temporary. Its principal ingredient was an absorption agent which reduced local swelling.

Since periodontal disease is due to multiple factors, such as calculus, trauma, dietary deficiency, systemic disease and psychosomatic factors, it is apparent that no chemotherapeutic agent could be applied which, in a single stroke as it were, would eliminate a combination of these factors. It is incumbent on the dentist to determine as many etiologic factors as he can and strive for their elimination by the use of specific procedures for each.[7]

8. Cooperation of the patient. The best efforts of the dentist go for nought if he fails to gain the cooperation of his patients. Recommendations for diet and home care if not carried out lead to the

6. Obin, J. N. Periodontal principles of restorative dentistry. New York D. J. 22:57 Feb. 1956.

7. Miller, S. C.; Okun, M. N., and Yudkoff, I. Periodontia, etiology, diagnosis and treatment. J. Canad. D. A. 21:447 Aug. 1955.

failure of therapy.[8] There is nothing so disheartening to a dentist as the patient who returns at each visit with teeth covered with debris after having had them carefully curetted and polished at the previous visit. The patient must accept his portion of the responsibility for successful treatment and must be advised of the possibility of poor results should he fail to do his share.

With these principles for establishing a proper diagnosis and for selecting treatable teeth, the aim of treatment becomes clear. Treatment should be directed toward the removal of causes of periodontal disease which involves teeth that have the ability to respond.

8. Whinston, G. J. Patient as an active participant in periodontal treatment. New York J. Den. 26:14 Jan. 1956.

Management of the patient with periodontal disease

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The title of this paper, "Management of the patient with periodontal disease," indicates an undesirable dentist-patient relationship. The dentist who attempts to manage his patients will exert great effort for a small return, and the effort will be at great emotional cost to himself.

What relation can dentists hope to bring about that will yield confidence, fuller understanding and continued appreciation? Simply, a mutually cooperative relationship throughout the time of treatment and for as long as that patient is under the dentist's care.

Cooperation must be forthcoming from the patient and the dentist, with both parties fulfilling their duties and responsibilities. Aristotle said, "No one loves the man he fears." The average patient will have fears which relate directly to the dentist, especially fear of pain and of the fee. If the patient's fears can be allayed through education about and understanding of his oral condition and through the knowledge that pain can be controlled, the basis of a cooperative relationship will be planted firmly. This theme of cooperation may well be explored through its application to the patient with periodontal disease.

Patients of this type may be found to comprise 70 to 80 per cent of the clientele in any general practice, and periodontal treatment, therefore, must be a part of general practice. It is the unusual patient who does not need some form of periodontal care, and one of the definite responsibilities of the dentist is to recognize and advise the patient of the existence of such disease.

The use of antibiotics, vaccines and similar products in periodontal treatment will yield no better results than the use of common mouthwashes made from alum, nut gall and the urine of an innocent boy did during the days of the Roman Empire.[1]

Presented as part of a symposium, "Periodontics for the General Practitioner," before the Section on Periodontics, ninety-seventh annual session, American Dental Association, Atlantic City, N. J., October 3, 1956.

Assistant professor of periodontia, New York University College of Dentistry, New York.

1. Bremner, M. D. K. Story of dentistry from the dawn of civilization to the present, ed. 3. Brooklyn, Dental Items of Interest Publishing Co., 1954, p. 53-54.

What has been said concerning treatment may be summarized in the following three steps, which may be likened to the "three R's" in schooling: removal of the causes, removal of the effects of the disease, and raising and maintaining the tissue resistance. Any treatment which neglects these basic steps will be ineffective.

The patient and the goal of creating a bipartisan relationship now may be discussed.

DIAGNOSIS

There are certain fundamental materials needed for making a diagnosis, such as, roentgenograms, casts, and dental and medical histories, in addition to the observations from clinical examination. The value of roentgenograms and casts as diagnostic tools need not be elaborated on, but a word should be said about the histories.

A dental history will furnish information on oral health as well as on the patient's reactions to many experiences, such as extractions and replacements, and even on his attitude toward dentists and dentistry in general. Thus, an opportunity is afforded by the taking of a history to begin the patient's education in regard to misconceptions as well as the benefits of treatment.

For example, a well-dressed man of about 40 came into a dentist's office and said that his teeth needed cleaning. The obvious procedure suggesting itself was just this, but the history disclosed the fact that he had never had a roentgenographic examination of his mouth. Further questioning of the patient revealed that he was aware of some loosening of his teeth. After a brief explanation of the need of a full diagnostic examination including the making of roentgenograms, he permitted a proper evaluation and accepted treatment, which he had avoided previously.

The influence of systemic health on oral structures has long been accepted by the health professions and has become an essential consideration in diagnosis and the planning of treatment. It is of extreme importance that the patient's systemic status be evaluated carefully before any treatment is begun, for the results of treatment will depend on the general health of the patient. A strong relation exists between local and systemic factors in the etiology of periodontal disease. It may not be possible to treat the effects of the disease process successfully as long as a strong systemic factor is operating to lower the local resistance. The removal of all local factors of irritation and dysfunction may not reestablish normal periodontal health as long as an underlying systemic disturbance remains active, nor will the correction of the systemic disturbance alone bring about permanent remission, so the interrelation of these factors must be carefully considered.

Obtaining a complete history is time consuming, but there are adjuncts that help the examiner by giving him a thorough survey of systemic abnormalities. The department of periodontia and oral medicine of New York University College of Dentistry has prepared a dental-medical history questionnaire which the patient may complete.[2] The dentist then reviews the observations with the patient during a personal interview. This interview, at which a survey of his health status is made, almost invariably creates an atmosphere of friendliness and evokes the confidence of the most reticent patient. Any history which indicates the need for medical consultation should be discussed with the patient, and the dentist should not hesitate to confer with the patient's physician.

The importance of the clinical examination, which must be recorded, has been mentioned. This should include the determination of the pocket depth, the gin-

2. Miller, S. C., and others. Use of the N.Y.U. dental-medical questionnaire as an adjunct to dental diagnosis. J.D.Educ. 16:2161 Nov. 1952.

gival condition, mobility, and the roentgenographic appearance.[3]

PRESENTING DIAGNOSIS AND TREATMENT PLAN

With all this information, the picture of the whole patient begins to take form, and it is possible to arrive at a diagnosis, prognosis and treatment plan with confidence. The result of this study should be the plan of treatment that the dentist believes, in all sincerity, is best suited for the particular patient.

The dentist should not fall into a trap of his own making by planning a treatment to follow what he may believe the patient will accept with least resistance, such as prophylaxis as requested in the instance mentioned earlier. Once an inadequate treatment plan is presented and accepted changes are always looked upon with disfavor by the patient and, subsequently, confidence begins to diminish. When the patient is made aware of additional needs as the treatment progresses, these new ideas become more difficult to accept, and slowly but certainly the patient manages the dentist.

Care should be taken to present all the benefits as well as the limitations of treatment. The patient will accept realistic expectations, and, in the event of untoward reactions in the future, such as the loss of a tooth, his confidence will still be maintained. The oral problems will be understood and the treatment plan will be accepted readily if the patient is educated during the initial interview and when the results of diagnosis are presented. If the dentist is confident because of proper study of the patient's condition, the feeling will be transferred readily to the patient.

There are many visual aids that may be used in the final presentation. Can any other model of the mouth show the defects to the patient as meaningfully as can his own casts? With a few words of explanation relating to a series of roentgenograms, a patient will readily understand where alveolar bone is lost and why mobility is present. A graphic charting of the periodontal pockets clearly shows the large areas of infection that are present in his mouth. During the clinical examination, the use of a hand mirror to demonstrate the presence of deep periodontal pockets, abnormal gingival conditions, suppuration and mobility will be most effective.[4]

The patient may be reassured honestly that pain need not be attendant on dental treatment. Local anesthetic agents given either topically or by injection, and various methods of inducing analgesia and premedication may be used. Inconveniences during and temporary inconveniences after some phases of treatment should be given a fair appraisal in the discussion.

The presentation of diagnosis and treatment is the most effective means for the dentist to gain the patient's cooperation. This implies initial confidence, which may become a continuous appreciation of treatment.

A proper presentation requires thorough preparation through study, a simple explanation of the oral status and a clear statement of the diagnosis and the treatment plan. This should be supported by visual demonstrations with aids showing the patient's oral condition, such as casts, roentgenograms and oral charts, as well as with additional educational aids.

DENTIST-PATIENT RELATIONSHIP

The responsibilities of the dentist include careful and thorough diagnosis and prognosis, the formulation of the treatment plan best suited to the particular patient, education of the patient toward a fuller realization of his problems and how they

3. Miller, S. C. Textbook of periodontia, ed. 3. Philadelphia, Blakiston Co., 1950.

4. Bless, J. L., and Tulkin, I. Successful dental practice. Philadelphia, J. B. Lippincott Co., 1947.

relate to his mouth and total health, and the elimination of fears, especially fear of pain.

This should be a bipartite relationship, and the patient must be made aware that he has responsibilities. After the dentist has explained the patient's condition and the patient has accepted the plan of treatment, the patient's main responsibilities begin. The payments and keeping appointments, definite obligations, will not be discussed here except to mention that these are reflections of the patient's total attitude.

The giving of dietary advice and instruction in gingival massage to the patient is an important part of the treatment. The carrying out of the suggested regimen is a definite patient responsibility, for, no matter how well the treatment is performed, the health of the tissues cannot be maintained without proper home care. Acceptance of the purpose and requested frequency of recall visits will help to insure successful treatment. With this type of cooperation on the part of the patient, suitable long-term relationships will be established.

It is obvious that the reactions of one patient will not be the same as those of every other and so the dentist's approaches or attitudes must vary somewhat. The many possible reactions of patients to disease may supply a clue to a particular patient's response to dental treatment. Even the "normal" patient has anxieties, but these will vary according to the severity of the disease. The instance previously cited in which the patient avoided the realistic situation and sought only a prophylaxis is not unusual. This avoidance reaction manifests itself in a denial of the presence of the disease. Often these patients will not follow home-care instructions, and the dentist must be aware of this type of reaction in order to cope adequately with the situation. Occasionally, a patient will channel pre-existing anxieties into a new concern, such as that for the periodontal disease that is present.[5]

With an awareness of many underlying problems, the dentist should not overlook the important correlation between physical and emotional well-being. When a patient fails to cooperate fully it may not be wholly the result of his reactions, but the fault of the dentist as well. The dentist has the responsibility of understanding the conditions that he intends to treat, in order to treat them adequately, and of being able to discuss them with the patient. Furthermore, he should be willing to understand the patient and his reactions.

SUMMARY

The total patient should be considered in making a diagnosis and planning treatment. The patient should be educated toward a fuller understanding of his own oral problems. With this understanding, the patient's cooperation and confidence during the ensuing treatment and the subsequent recalls may be assured.

45 South Broadway

5. Bellak, L.: Psychology of physical illness. New York, Grune and Stratton, 1952, p. 4.

The Aims of Psychotherapy • The highest aim of psychotherapy is not to transport the patient into an impossible state of happiness, but to help him to attain the firmness and philosophical patience which will enable him to endure suffering. *C. G. Jung, Modern Man in Search of a Soul.*

Periodontal disease in children and adolescents: a clinical study

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Recent epidemiological studies[1] have shown that there is a considerable prevalence of periodontal disease in children by the time they are 13 or 14 years of age. This observation is not surprising when it is realized that the prevalence of periodontal disease reaches epidemic proportions in the adult. Periodontitis, the most common periodontal disease of the adult, is a chronic, slowly progressive disease. In many instances, therefore, it must, of necessity, have had its initiation approximately with the onset of puberty, or before, in order to cause the amount of destruction seen in the adult patient of 20 to 30 years of age.

In the deciduous dentition, on the other hand, periodontal disease is not common. When it does occur, it is almost invariably a marginal gingivitis, which is the result of poor oral hygiene, calculus, or caries. The deciduous teeth are probably lost before they have an opportunity to become more seriously involved.

It is the purpose of this paper, therefore, to review the etiology, treatment and types of periodontal disease commonly seen in the child as he approaches puberty and progresses into young adulthood.

GINGIVITIS

Gingivitis, the most common periodontal disease of puberty, is characterized by an exaggerated response to a mild irritant. The usual reaction is a hyperplastic gingivitis, with an enlargement, loss of stippling, and bleeding from the interdental papillae, particularly, in the anterior region of the mouth. The pocket depth is frequently 4 mm. or more and is due largely to an increase in bulk of tissue. Bleeding, which may occur from the slightest probing, or even as a result of mastication, is another very important diagnostic sign. In conditions of long standing, however, the gingiva may become fibrosed, stippling may reappear, and bleeding may be entirely absent. The faulty gingival architecture, as a result of the hyperplasia, and the chronic inflammation, however, rarely or never regress spontaneously. Periodontal therapy is almost always necessary for a cure or the disease will eventually progress into the underlying structures and become periodontitis in the adult.

The local irritants responsible for the inflammatory response in children are similar to those responsible for initiating marginal gingivitis and periodontitis in the adult. In addition to poor oral hygiene, calculus, materia alba, caries, poor restorative dentistry and malaligned teeth, however, there are etiological

Formerly, assistant professor of periodontology, College of Dentistry, University of Southern California; at present, National Institute of Dental Research, National Institutes of Health.

1. Marshall-Day, C. D.; Stephens, R. G., and Quigley, L. F., Jr. Periodontal disease: prevalence and incidence. J. Periodont. 26:185 July 1955.

factors present in these instances which are nonexistent, or not commonly seen, in the adult. They are (1) disharmonious action between active and passive eruption, resulting in a delayed passive eruption; (2) hormonal imbalances; (3) mouth breathing; (4) orthodontic appliances; (5) exfoliation of deciduous teeth and (6) high mucosal and muscular attachments.

1. Delayed passive eruption—When the tooth is erupting, the gingival margin is not protected from insult by the protective bulge of the gingival third of the tooth. In the erupting tooth, therefore, the insult received by the surrounding gingival tissue may be so severe that the epithelial attachment on the enamel of the tooth becomes separated down to the cementoenamel junction, with the result that an extremely deep gingival sulcus occurs. A deepened sulcus of this nature is readily susceptible to food impaction, food retention and bacterial invasion. Inflammation, the usual sequela, converts the deepened sulcus into a deep gingival pocket. The tooth, meanwhile, may complete its eruption. The pathologic process in the marginal gingiva, however, prevents it from undergoing atrophy, and thus, passive eruption does not accompany active eruption.

A possible example of a delayed passive eruption is seen in Figure 1. The patient's only complaint was that his teeth looked small, and he wanted to know if this condition could be corrected.

2. Hormonal imbalances — The similarity in the clinical appearance of the gingiva in response to mild local irritation in adolescence and in pregnancy is so striking that it is probable that both conditions are due to similar systemic factors. In both these conditions, it is mainly the interdental papilla, and mainly the papilla in the anterior region of the mouth, which shows the hyperplastic response.

3. Mouth breathing—Enlarged tonsils and adenoids are frequent childhood disturbances. Mouth breathing, a sequela of these abnormal conditions, results in a dehydration of the tissues, particularly in the anterior region of the mouth. This, in itself, is usually sufficient to lower tissue resistance and cause an inflammatory hyperplasia.

4. Orthodontic appliances — Orthodontic appliances make it difficult to maintain proper oral hygiene. Poorly fitting bands which impinge on the gingiva are frequently an additional source of mechanical irritation.

5. Exfoliation of deciduous teeth—The presence of loose deciduous teeth not only permits food to cause gingival insult, but, in addition, may be a mechanical irritant to the surrounding gingival tissues.

6. High mucosal and muscular attachments—High mucosal or muscular at-

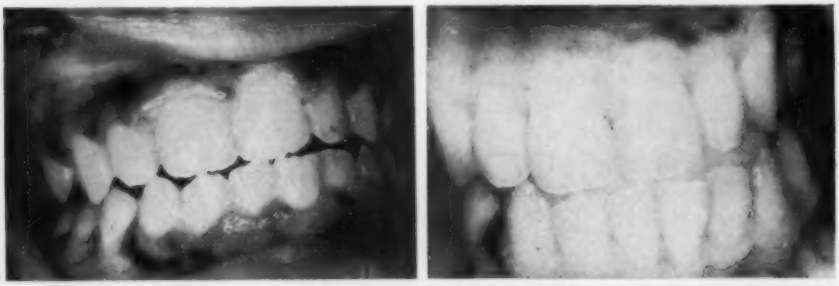

Fig. 1 • Left: Preoperative view. Etiology, in part, was delayed passive eruption. Right: Postoperative view. After removal of all local irritants, gingival architecture was restored by surgery

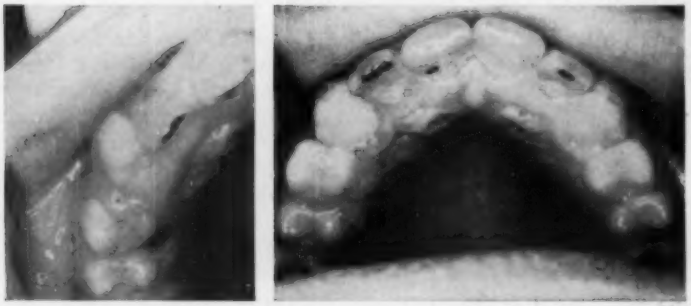

Fig. 2 • Left: Preoperative view. Presence of inflammation resulted in excess growth of tissue, which caused maxillary right cuspid to erupt labially. Right: Postoperative view. After all local irritants were removed, remaining excess tissue was removed by gingivectomy. No orthodontic treatment was necessary

tachments either completely obliterate the oral vestibule, or create an extremely shallow one, with the result that the self-cleansing ability of the oral cavity is greatly diminished. The shallow vestibule also makes it difficult to insert a toothbrush properly, and to maintain good oral hygiene.

After all known etiological factors have been removed, the gingival architecture must be restored by re-establishing physiologic and deflecting contours. This frequently can be accomplished by curettage and good oral hygiene alone. This is particularly true in those instances where the inflammatory hyperplasia is extremely mild, the tissue boggy in tone, and where the teeth have not as yet fully erupted. When the teeth have become fully erupted, and the gingiva, as a result of passive eruption, has become protected by the bulge of the gingival third of the tooth, normal gingival architecture may then re-establish itself. In most instances, however, additional therapy, consisting of a gingivectomy or gingivoplasty, will be necessary in order to eliminate completely bulk of tissue and establish correct gingival form. This is particularly true where the inflammation is long standing and the resulting gingival hyperplasia is fibrous in character.

If the patient is a mouth breather, his physician should be consulted to see whether this condition is amenable to treatment, and, in the meantime, a white petroleum jelly should be applied to the gingiva at night before retiring, in order to prevent the drying out of the gingival tissues. In instances where tooth malalignment has been caused by bulk of tissue alone, a gingivectomy without any additional orthodontic treatment may be sufficient in many instances to correct this malalignment (Fig. 2).

The initial elimination of the gingival involvement, however, is not the great problem in children and adolescents. The difficulty lies in maintaining the gingival health after it has been re-established. Since even the slightest local irritation may result in pronounced gingival changes, recalls at frequent intervals are essential. At these visits the patient should demonstrate his oral hygiene procedures, receive a prophylaxis, or any additional periodontal therapy that might be necessary. Periodontal diseases almost never heal spontaneously. To "wait and see what will happen" is negligence on the part of the dentist.

Hyperplastic Gingivitis • Hyperplastic gingivitis may also result from the admin-

istration of the drug diphenylhydantoin sodium which is used in the treatment of epileptic and cerebral palsied children. In the very young children the gingival hyperplasia is usually firm, stippled, and frequently so extensive as to completely cover one or more teeth. Gingival inflammation, clinically, may be absent. In older children and adolescents, however, the hyperplasia is usually limited to the labial and buccal interproximal papillae. In these older groups, inflammatory changes of various degrees are usually superimposed on the fibrous hyperplasia.

The hydantoins, of which diphenylhydantoin sodium is one, seem to be the only group of anticonvulsants which predispose to gingival hyperplasia. By consulting the patient's physician, therefore, it may be possible to substitute one of the newer drugs, such as primidone, in which case a spontaneous regression of the hyperplastic tissue may occasionally, but not necessarily, occur.

In instances where drug substitution is not possible, then the method of choice for this type of hyperplastic gingivitis is identical as for the type described previously. The prognosis, however, is quite different. Since the etiologic factor, namely, the diphenylhydantoin sodium cannot be removed in many instances, a regrowth of tissue to some extent is to be expected, even with the most scrupulous home care. In addition, many of the cerebral palsy patients are mentally retarded. The bulk of the home care, therefore, falls on the parents. In instances where the patient's parents are extremely cooperative and will assume the burden of all the oral hygiene necessary for their children, the result is long lasting, and in many instances may be permanent. Nevertheless, even where parents are not cooperative, a gingivectomy is still justified, even though recurrence is inevitable, where the gingival enlargement is so great as to be an esthetic problem or where it interferes with proper mastication.

Acute Necrotizing Ulcerative Gingivitis • The primary attack in this disease is most commonly seen between the onset of puberty and the late twenties. It is rarely, if ever, seen in young children, and if an adult has not had a primary attack before he is 30 years of age, it would be uncommon for him to contract one. On the other hand, if a primary attack did occur when he was an adolescent, future attacks may recur at any age. The etiologic factor considered by some to be responsible for the sudden onset of the disease is an emotional upset. Goldman, for this reason aptly refers to acute necrotizing ulcerative gingivitis as "the gastric ulcer of the oral cavity." This clinical impression has been substantiated by the work of Moulton, Ewen and Thieman.[2]

As in all periodontal disease, one of the important aims of treatment is the establishment of physiologic form and deflecting contours. In a primary attack, curettage, mouth rinsing and proper oral hygiene is frequently sufficient to accomplish this. If interproximal craters remain after this treatment has been instituted, however, then these craters must be removed by gingivoplasty (Fig. 3).

The patient should also be made aware of the necessity of proper rest and diet, and of the part which may be played by emotional upsets. In most adolescents, the emotional upsets occur at the time of midterm and final examinations. These crises, therefore, being temporary in nature, permit a complete cure. In instances in which the condition is resistant to treatment, however, psychiatric consultations should be obtained.

Unless a systemic reaction is present, with high fever, and malaise, antibiotics should not be used as part of therapy. Permanent cures can only be obtained with restoration of gingival contours and not by the use of antibiotics.

2. Moulton, Ruth; Ewen, Sol, and Thieman, W. Emotional factors in periodontal disease. Oral Surg., Oral Med. & Oral Path. 5:833 Aug. 1952.

Acute Herpetic Gingivostomatitis • The great importance of this disease lies in the fact that it is probably the most misdiagnosed disease in the oral cavity. It is frequently misdiagnosed as acute necrotizing ulcerative gingivitis. The differential diagnosis, however, can be made readily. Acute herpetic gingivostomatitis is a common disease of childhood, very contagious in nature and accompanied usually by a temperature that may be as high as 105°F. in some instances. Vesicles of varying size, from 0.5 mm. to 10 mm., may appear, but are rarely seen, as they undergo ulceration rapidly and then often coalesce to form irregularly-shaped lesions on the gingiva, palate, or mucous membranes of the cheeks and lips. In addition, the entire gingiva and mucous membranes may be swollen, red and very painful, and may bleed readily. The tips of the interdental papillae, however, are not necrotic, and interproximal craters are not found.

On the other hand, in acute necrotizing ulcerative gingivitis the tips of the interdental papillae are always necrotic. Untreated, these necrotic interdental papillae become interproximal craters.

Acute herpetic gingivostomatitis is a self-limiting disease and usually disappears within two weeks. Painting the ulcerated areas with gentian violet or methylene blue, and having the patient rinse with warm Karo syrup mouthwashes, aids in overcoming the pain and discomfort. The patient should be isolated, as this is a communicable infection.

PERIODONTOSIS

Periodontosis is an uncommon, but unfortunately not rare, periodontal disease, found primarily in young girls between the ages of puberty and young adulthood. It is characterized by a "degenerative, noninflammatory destruction of the periodontium originating in one or more of the periodontal structures, and is further characterized by migration and loosening of the teeth in the presence or absence of secondary proliferation and pocket formation, or secondary gingival disease."[3]

In the cases observed by the author, however, not only were periodontal pockets always present, but inflammatory changes of various degrees, were regularly observed. Rarely, in this disease, can a systemic contributing factor be demonstrated.

The prognosis, contrary to popular opinion, is not entirely hopeless. It is true that if every tooth in the mouth were severely affected, the prognosis would be

3. Report from the 1949 nomenclature committee of the American Academy of Periodontology. J. Periodont. 21:40 Jan. 1950.

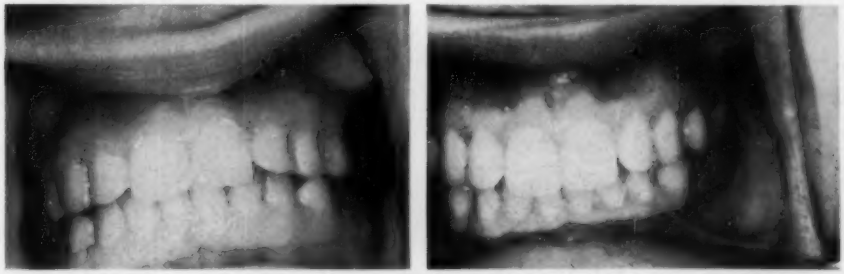

Fig. 3 • Left: Acute necrotizing ulcerative gingivitis. Lesions are limited to gingivae which are edematous and tips of which are necrotic. Right: Postoperative view. Treatment was not, and should not, be terminated until gingival architecture has been restored completely

Fig. 4 • Fibroma above upper right lateral incisor in five year old boy. Although fibroma is not a periodontal disease, its proper removal requires knowledge of periodontal tissues

hopeless. This, however, is usually not the case. The loss of attachment apparatus and pocket formation usually are limited to the four first permanent molars and one or more incisor teeth. Therefore, it is only these teeth which offer a problem in diagnosis and prognosis. There is no reason to assume that if treated properly the destructive process present in these localized areas will, or can, progress to adjoining teeth. Only if left untreated should this be expected to occur.

Since the most prominent feature of this disease is loss of attachment apparatus, treatment, in addition to elimination of the pockets and restoration of physiologic contours, must be directed to correction of occlusal factors. The occlusion should be equilibrated to distribute the occlusal forces more evenly, and the occlusal tables should be narrowed so as to eliminate torque. Orthodontic treatment may be instituted to realign properly teeth which have migrated, and splints should be constructed to maintain them in place. Splinting, temporary or provisional, may also be done to stabilize all mobile teeth.

FIBROMA OF THE GINGIVA

The fibroma is a benign, painless, well-encapsulated growth which varies in color from pale pink to a deep red depending on the degree of inflammation present. The fibroma occurring on the gingiva arises from either the mucoperiosteum or the periodontal membrane, and is frequently called a fibrous epulis. They may occur at any age, and the attachment may be either pedunculated or sessile. Figure 4 shows one occurring on the labial surface above the maxillary right lateral deciduous incisor in a five year old boy. Local irritation, such as calculus and food impaction, is a predisposing factor. Instances arise, however, which cannot be satisfactorily explained on this basis.

Treatment should consist of complete excision of the tumor with restoration of the physiologic architecture of the gingiva. Considering the benign nature of this lesion, the extraction of adjoining teeth is never justified.

Progress • To be possessed of a vigorous mind is not enough, the prime requisite is rightly to apply it. The greatest minds, as they are capable of the highest excellences, are open likewise to the greatest aberrations; and those who travel very slowly may yet make far greater progress, provided they keep always to the straight road than those who, while they run, forsake it. *Descartes.*

Conservative treatment of periodontal disease

Norman E. Alderman, D.D.S., Hempstead, N. Y.

In order to effect a cure of periodontal disease, all known causes that produce this disease and the effects of those causes must be removed and tissue resistance must be raised.[1] Conservative periodontal treatment should utilize all of the reparative processes of the body in eliminating the disease with a minimum of tissue loss. Once maximum oral health has been achieved, it should be maintained at that level.

Pocket reduction and elimination are one of the aims of conservative treatment. If surgery is attempted first, one of the effects of the disease is eliminated—not the causes. Afterward conservative methods, such as instrumentation, home-care and dietary correction, must be instituted to effect a cure. Therefore, conservative treatment should be used first, as in many instances it obviates the necessity for surgical treatment.

In attempting periodontal treatment, the following steps should be taken: the making of a diagnosis and a prognosis; the removal of such irritants as supragingival deposits, subgingival deposits, mechanical, chemical and atmospheric irritants, destructive habits and food impaction; the institution of proper home care methods; the correction and fortification of nutrition; the equilibration of occlusion; temporary splinting, when indicated; surgery when necessary and the polishing of all exposed tooth surfaces.

The removal of common irritants and the best methods of home care to effect the desired goal should be discussed in more detail.

REMOVAL OF COMMON IRRITANTS

Since calculus is one of the causative factors in periodontal disease, the need for proper removal of this irritant should be considered. Scalers are designed for heavy-duty removal of supragingival and whatever subgingival deposits they can reach effectively. One of the most common errors in dentistry today, however, is the improper placement of the instruments for the removal of subgingival deposits. Contact of the instrument with the most occlusal portion of the subgingival deposit is most often interpreted as contact with the base of the pocket, and the strokes of the scaler or curet proceed from this point occlusally. The subgingival deposit, however, remains to produce its damage to the periodontal structures.

One method of alleviating this problem is to move the instrument toward the soft-tissue side of the pocket to allow it to get in an apical direction to the deposit. Realization of the fact that there

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1. Miller, S. C. Textbook of periodontia, ed. 3. Philadelphia, Blakiston Co., 1950.

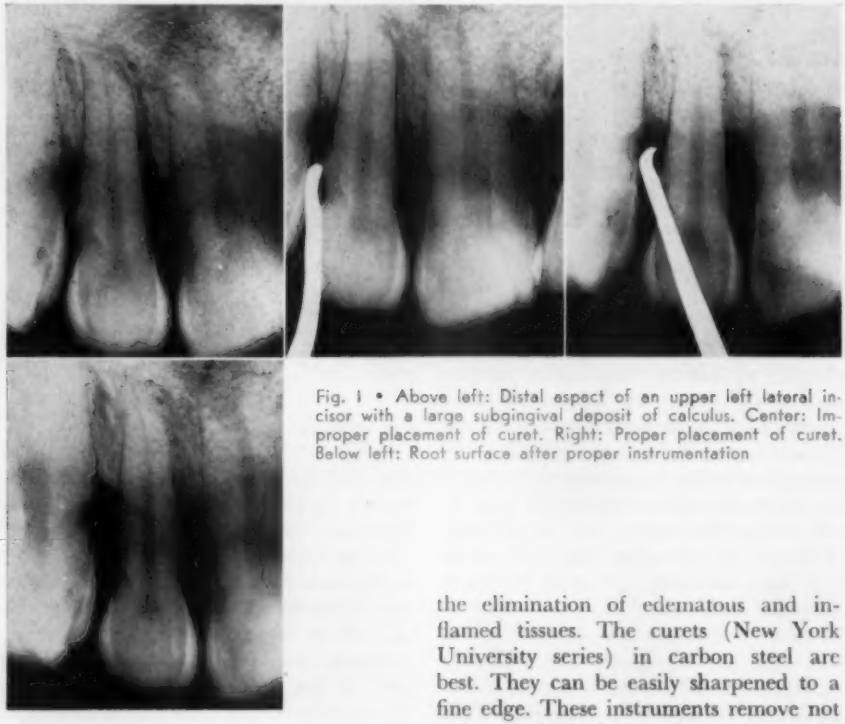

Fig. 1 • Above left: Distal aspect of an upper left lateral incisor with a large subgingival deposit of calculus. Center: Improper placement of curet. Right: Proper placement of curet. Below left: Root surface after proper instrumentation

is a zone of inflammation and epithelial detachment apical to a subgingival deposit enables the operator to use this space to advantage in the proper placement of the instrument. Once the instrument is apical to the deposit, the operator, with proper strokes, can expect to eliminate the calculus (Fig. 1). There are many designs of scalers and curets available to the profession today. At New York University College of Dentistry, the McCall scalers, S series, are used.

Conservative subgingival curettage is most often the procedure of choice, since there is the possibility of reattachment and clinical closure of the pockets as well as of a return to normal color and contour in the gingiva. In this procedure, there is minimal loss of tissue through recession and nature's reparative processes are being used in pocket reduction and the elimination of edematous and inflamed tissues. The curets (New York University series) in carbon steel are best. They can be easily sharpened to a fine edge. These instruments remove not only subgingival deposits and smooth roughened cementum but, with their soft-tissue blade, granulomatous tissue and epithelial pocket lining as well. A blood clot, which is the basis of healing and repair, results. This type of treatment should be done carefully, and every effort should be made to preserve the blood clot as its formation takes place. Excellent results have been obtained with this technic (Fig. 2, left and center).

Prior to subgingival curettage, all periodontal pockets should be probed and charted. Every office should have a few periodontal probes. This is a right-angle instrument, calibrated in millimeters, that enables the operator to outline the pockets and determine their depth. It is not possible to detect pockets without injury to the epithelial attachment if a sharp explorer point is used (Fig. 2, right).

HOME CARE

The patient's habits of oral hygiene may determine the success or failure of treatment of periodontal disease. Proper motivation of the patient by demonstration of his own needs is extremely important. Proper instruction in the use of the toothbrush and the interdental stimulator, if necessary, is the responsibility of the dentist.

The modified Stillman method of toothbrush massage has proved successful for the vast majority of patients who have minimal loss of interproximal tissue. With this method the bristles effectually reach the buccal and lingual plates of tissue right to the tip of the interdental papilla and properly cleanse the teeth as well. In the modified Stillman method of brushing,[2] the bristles point apically and are placed parallel to the teeth and gingiva. When in position, the bristles are vibrated with a pumping action toward the occlusal surface, thus promoting a moving circulation and a hornified gingival tissue and thoroughly cleansing.

In instances in which chronic periodontal disease or acute necrotizing ulcerative gingivitis has developed or periodontal surgery has taken place, there may remain a wide buccolingual interdental shelf of tissue that is not reached adequately with the routine methods of home care. In these instances the Charters method of brushing[3] is utilized as an adjunct to the modified Stillman method. The Charters method of brushing can be performed only on the labial or buccal surfaces of the gingiva for the most part. The bristles of the brush point occlusally and are pressed interdentally at a 45 degree angle to the long axis of the teeth, and they are vibrated in this position. The proximal surfaces of the teeth are cleansed, and the soft tissue is stimulated properly.

Generally speaking, the interdental stimulator, the rubber tip, is designed to increase gingival circulation and produce properly contoured interdental areas that prevent food impingement. It is more efficient when used at a 45 degree angle to the long axis of the teeth, with its point in the same direction as the interdental papilla. The use of an interdental stimulator, when indicated, by patients with such disorders as necrotizing ulcerative gingivitis will help to rebuild through recontouring the craterized interproximal papilla. Its use may eliminate the need for gingivoplasty technics in these patients (Fig. 3).

Throughout the ages, dentists have advocated various mouthwashes for any number of oral disorders. With the ad-

2. Stillman, P. R. Stimulation of gingiva. J.A.D.A. 15:1077 June 1928.

3. Charters, W. J. Ideal method of stimulating gums and cleansing teeth. D. Survey 6:38 Oct. 1930.

Fig. 2 • Left: Gingival overgrowth due to local irritating factors and poor home care. Center: Instance in which healing occurred without the use of periodontal surgery. Right: Periodontal probe with millimeter markings

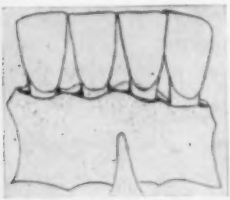

Fig. 3 • Indication for use of interdental stimulator to eliminate interproximal crater

vent of greater number of allergic responses to increasingly more chemotherapeutic agents, it might be safer and surer to suggest the use of hot water under pressure as the best method of oral lavage. There is no instance of allergy to water on record, and the heat brings to the region additional circulation, which is an aid to nature's protective, defensive, and reparative mechanisms. In addition, the mechanical cleansing action removes food particles and necrotic tissue and effectively cuts down the bacteria count. There is no contraindication to lavage with water, and it can be used as often as the patient can perform the technic. Irrigating syringes may be used, or the patient may take small sips of hot water from a glass and forcibly push the water between the teeth, doing a small section of the mouth at a time. Any acute gingival or oral inflammatory condition will improve with hydrotherapy.

In the treatment of acute necrotizing ulcerative gingivitis, it is correctly believed that the condition is neither infectious nor contagious. Therefore, there is no need for the antibiotics as part of the armamentarium. The objective in the treatment of this condition would be to stop the process of necrosis and to restore the interproximal tissue to health. This can be accomplished by eliminating all irritants, mainly, calculus, necrotic tissues, spicy foods and smoking; raising the nutritive level by effective diet and vitamin therapy; introducing hydrotherapy for home care, and attempting to reduce emotional tension. The ravages of interdental necrosis leave the interdental papilla depressed below the levels of the labial and lingual plates of tissue. If the patient is dismissed after the acute phase has subsided, there may be a recurrence of the same condition. Recontouring of interproximal papilla is necessary in order to make the mouth as self-cleansing as possible. This may be accomplished by the proper application of the toothbrush and the interdental stimulator. By this technic, the labial portion of the crater is compressed and retention of food particles interdentally is eliminated (Fig. 4).

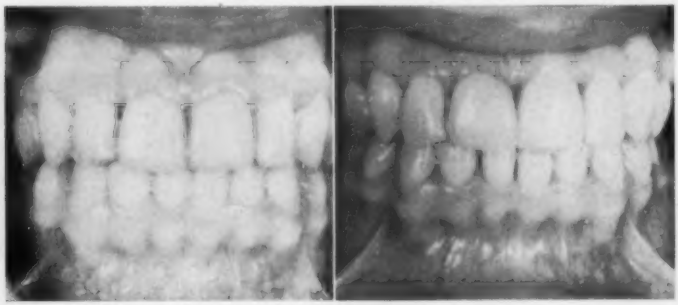

Fig. 4 • Left: Acute ulcerative necrotizing gingivitis with classic symptoms. Right: Instance in which healing occurred by use of conservative means

MOUTH BREATHING AS AN IRRITANT

Another common irritant to the gingiva is dryness during mouth breathing. All the oral tissues are normally moistened with saliva. Whenever the patient is unable to breathe properly through the nose, breathing through the mouth causes the gingiva to become inflamed, edematous and hemorrhagic. One method of approach would be to eliminate the cause of mouth breathing by having the patient consult an otolaryngologist. To treat the condition palliatively by dental means, it would be necessary for the patient to apply an emollient, such as cocoa butter or petroleum jelly, over the dried gingiva prior to retiring and as many times a day as necessary. This protective layer prevents the drying of the gingiva.

COMMENT

There is no single method of treatment for periodontal disease. Since there are many causative factors that produce the disease process, all known methods must be used to restore the mouth to health.

Patients generally prefer conservative treatment to the use of surgical procedures and realize the necessity for longer therapy. Results of conservative treatment are good, and no attempt to rush treatment should be made, as the cure of periodontal disease is a healing process and, as such, takes time.

230 Hilton Avenue

The supporting dental structures

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The gingiva, cementum, periodontal ligaments and alveolar bone constitute the supporting attachment apparatus of the teeth collectively designated as the periodontium. These tissues are modified for their particular use, and they function as parts of a unit (the dentoperiodontal unit).

THE GINGIVA

The gingiva is part of the oral mucosa. The oral mucosa may be divided, primarily, into three different types:[1] (1) the gingiva and the covering of the hard palate, which may be termed the masticatory mucosa; (2) the dorsum of the tongue, which is covered by specialized mucosa, and (3) the remainder of the oral mucosa membrane, which may be termed the lining mucosa. The gingiva, in turn, is that part of the oral masticatory mucosa that is attached to teeth and alveolar processes of the jaws.

Anatomical Description • The gingiva may be divided into the free gingiva and papilla.

The firmly attached gingiva is separated from the loosely anchored, and therefore movable, alveolar mucosa by a scalloped line (mucogingival junction). This line of demarcation, between the

Associate professor and chairman, department of periodontics, Loyola University School of Dentistry, Chicago College of Dental Surgery.

1. Orban, B. Oral histology and embryology, ed. 4, St. Louis, C. V. Mosby Co., 1957.

gingiva and alveolar mucosa, occurs on the outer surfaces of both jaws. A similar line occurs on the inner surface of the lower jaw between gingiva and the mucosa of the floor of the mouth. On the palate, however, no clear dividing line is present, because the entire palatal mucosa is firmly attached to the bone and, therefore, is immovable.

Free Gingiva • The margin of the gingiva is not directly attached to the surface of the tooth, and is termed the free gingiva. Between the free gingiva, which surrounds the tooth as a collar would, and the tooth, extends the gingival sulcus. The bottom of the gingival sulcus is often marked on the surface of the gingiva by a fine groove which runs parallel to the gingival margin—the free gingival groove. The free gingival groove is the line of demarcation between the mobile free gingiva and the firmly anchored attached gingiva. Histologically this groove in some instances corresponds to a heavy epithelial ridge.[2]

The free gingival groove and the epithelial ridge are brought about by functional impacts on the free gingiva, folding the movable free part back on the attached and immovable zone.

Attached Gingiva • The surface of the attached gingiva is characterized by the presence of numerous, regularly distributed networks of low ridges which give the tissue an appearance somewhat resembling the peel of an orange. This "orange peel" appearance is called stippling. The stippled zone may be finely grained or quite rough. The cause of the stippling effect is the presence of collagenous fiber bundles that enter the connective tissue papillae and elevate the epithelium into slightly-rounded surface protrusions. (The disappearance of stippling is an indication of edema and is one of the important signs of a progressing gingivitis.)

While the degree of stippling and the texture of the collagenous fibers vary with different individuals, there are also differences according to age and sex.[3] In younger females the connective tissue is more finely textured than that of men; however, with increasing age, the collagenous fiber bundles become more coarse in both sexes (Fig. 1).

Papillary Gingiva • The gingiva that is between the teeth, and the gingiva behind the last molar, is the papillary gingiva.

In the normal dentition, with teeth in contact, the interdental papilla is roughly tentlike, and its crest is formed by the free gingiva common to the adjacent teeth. In the case of a diastema, however, the interdental papilla does not end in a sharp crest, but in a blunt ridge or even a concave surface. In these instances the free gingiva of the adjacent teeth forms only the mesial and distal margins of the interdental papilla.

The interdental papilla has been separated from the rest of the gingiva as a clinical unit. Because of its topography, the interdental papilla has achieved special clinical importance and pathologic significance.

The gingiva can be subdivided into the following:

1. Papillary gingiva—the interdental papilla.
2. Marginal gingiva—the free gingiva localized to labial, buccal, lingual aspects.
3. Attached gingiva — the gingiva firmly attached to bone and tooth.

These divisions form a basis for systematic clinical examination in assessing the severity of gingivitis (the PMA index).[4]

2. Orban, Balint. Clinical and histologic study of the surface characteristics of the gingiva. Oral Surg., Oral Med. & Oral Path. 1:827 Sept. 1948.

3. Wentz, F. M.; Maier, A. W., and Orban, B. Age changes and sex differences in the clinically "normal" gingiva. J. Periodont. 23:13 Jan. 1952.

4. Massler, Maury; Schour, Isaac, and Chopra, Baldev. Occurrence of gingivitis in suburban Chicago school children. J. Periodont. 21:146 July 1950.

Microscopic Features • Since the gingiva surrounds the teeth, it is subjected to forces of friction and pressure during mastication. The structure of the gingiva is adapted to meet these stresses.

Epithelium • Usually the free and attached gingiva is covered by a hornified, stratified, squamous epithelium. If the stratum corneum is well developed, there is also a well-marked stratum granulosum underlying the hornified surface layer.

In other instances there is incomplete hornification (parakeratosis), characterized by a well-defined surface layer consisting of flattened cells with pyknotic nuclei. Keratinization and parakeratosis should be considered variations within the normal. Though some authors consider the complete lack of keratinization also as a normal variation, no such instance could be found in 149 biopsy specimens of clinically normal gingiva.[2]

The cells of the basal layer of the surface epithelium may contain pigment granules (melanin).[1] The pigment, however, is not formed by the basal cells but by special melanoblasts arranged within the basal layer, and in routine preparations they appear as clear cells. However, special staining methods (dopa reaction) reveal the melanoblasts as dendritic cells containing the prophase of melanin. Pigmentation is a normal occurrence in Negroes and in dark complexioned persons of the Caucasian race.

The epithelial lining of the gingival sulcus continues into an epithelial cuff attached to the surface of the tooth.

Connective Tissue • The lamina propria of the gingiva consists of dense connective tissue which lacks elastic fibers. Collagen fibers arranged in strong bundles arise from the cervical area of cementum (gingival group of periodontal membrane fibers), in part from the outer surface of the alveolar process. They interlace with bundles of varying direction. Circular fibers in the attached gingiva, however,

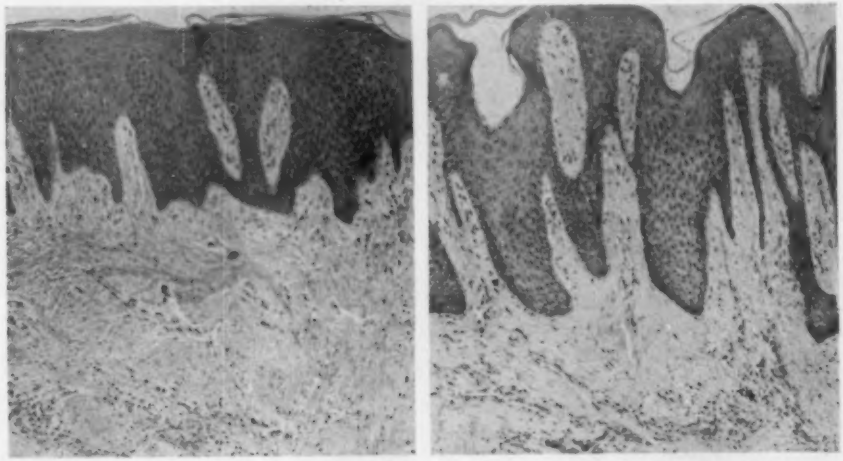

Fig. 1 • Age changes in normal gingiva. Left: Biopsy specimen of attached gingiva, in woman age 23 years. Connective tissue is finely fibered. Moderate number of fibroblasts are present. Epithelium shows broad ridges. Right: Biopsy specimen of attached gingiva, in woman age 72 years. Connective tissue is coarse and heavily bundled with few fibroblasts. Epithelium reflects fibrotic condition with thin ridging. Note surface irregularity—apparent clinically as stippling

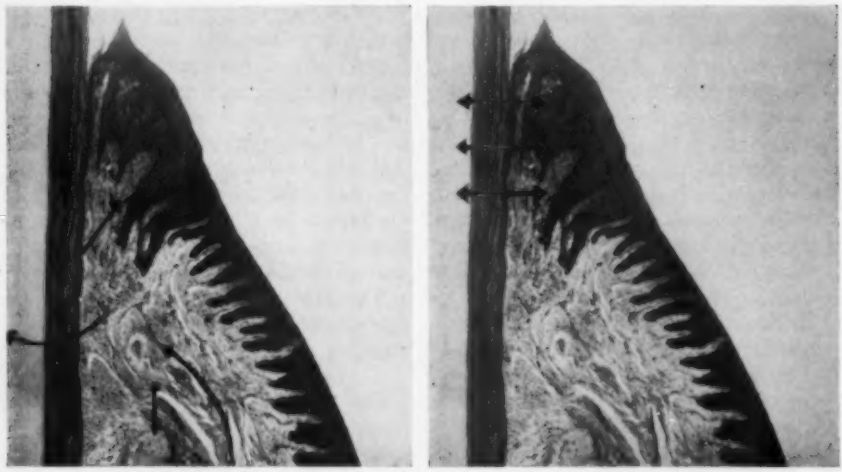

Fig. 2 • Gingival fibrous attachments and attached epithelial sealing cuff of dentogingival junction. Left: Arrows indicate fiber groups. Dentogingival fibers extend from cementum beneath epithelial attachment into lamina propria of gingiva. Alveologingival fibers arise from alveolar crest and insert into lamina propria. Circular fibers are believed to encompass tooth. Accessory fibers are transseptal fibers and dentoperiosteal fibers. Interproximally, a group of prominent horizontal fibers extend between adjoining teeth (transseptal group—not shown). On the lateral surfaces of jaws, dentoperiosteal fibers extend from lamina propria of gingiva and periosteum of alveolar bone to tooth. Right: Arrows indicate attached epithelial cuff which effects seal of gingiva to tooth

are sometimes rather conspicuous. The gingival fibers are arranged functionally in the following groups[5] (Fig. 2):

1. The dentogingival fibers extend from cementum beneath the epithelial attachment into the lamina propria of the gingiva. This group is usually the most numerous.

2. The alveologingival fibers arise from the alveolar crest and insert into the lamina propria.

3. The circular fibers[6-8] are a small group of fibers which are believed to encompass the tooth. (Many so-called circular fibers may be tangential sections of alveologingival or dentogingival fibers.)

4. The accessory fibers consist of the following: Interproximally a group of prominent horizontal fibers extends between the approximating teeth (transseptal group). On the lateral surfaces of the jaws a fiber group extends from the periosteum of the alveolar bone to the tooth (dentoperiosteal).[9]

The high and numerous connective tissue papillae penetrate into the epithelium to a varying degree. These papillae elevate the epithelium into surface protrusions (stippling).

In this papillary layer the capillaries of the blood vascular supply of the gingiva may be observed. These capillaries arise from the interdental alveolar arteries which traverse intrabony canals (Hirshfeld's canals) and perforate the

5. Erausquin, Jorge. Histologia dentaria humana. Buenos Aires, Progrental, 1953.

6. Arnim, S. S., and Hagerman, D. A. Connective tissue fibers of the marginal gingiva. J.A.D.A. 47:271 Sept. 1953.

7. Orban, B. Entwicklungs geschichte und Histogenese. Fortschr. Zahnhk. (Part I) 3:749, 1927.

8. Weski, O. Röntgenologisch—anatomische Studien aus dem Gebiete der Kieferpathologie. Vrtljschr. Zahnhk., Berlin 38:1, 1922.

9. Goldman, H. M. Topography and role of the gingival fibers. J. D. Res. 30:331 June 1951.

alveolar crest in the interdental spaces and end in the gingiva, supplying the interdental papilla and the adjacent areas of the buccal and lingual gingiva. In the gingiva these branches anastomose with superficial branches of arteries which supply the oral and vestibular mucosa and marginal gingiva, for instance, with branches of the lingual, buccinator, mental and palatine arteries.

There is no clear demarcation of the submucosa of the gingiva; instead, periosteum, submucosa and lamina propria seem to blend into one firm pad of connective tissue.

In the connective tissue adjacent to the base of the gingival sulcus, an infiltration of chronic inflammatory cells is always found.[3,10] The presence of plasma cells, lymphocytes and histiocytes is usually interpreted as a part of a defense mechanism responding to the products of bacterial activity in the sulcus.

The following sensory nerve structures have been described: nonmedullated fibers which extend from the connective tissue into the epithelium,[11] and specialized nerve endings in the papillary layer of the lamina propria including Meissner's corpuscles, and Krause's corpuscles.

Normal Clinical Features • The color of the gingiva is pale pink. Pallor varies according to degree of vascularity, degree of keratinization of epithelium and degree of pigmentation. The marginal contour is thin, and the papillary contour is pointed. The texture is stippled. The surface has been described as being like an orange peel in appearance.[2]

The consistency is firm. The gingiva is firmly anchored to the teeth and underlying alveolar bone.

There is, normally, no exudate. If the gingiva is clinically normal, no pathologic pocket exists; instead, a "sulcus" is present.

Dentogingival Junction • The mode of attachment of the oral mucosa to the tooth can be understood only if the oral mucosa is regarded as an inseparable functional unit consisting of (1) the fibrous attachment of the lamina propria and (2) the epithelial attachment.

As in the skin and in other parts of the oral mucous membrane, there is also in the dentogingival junction a division of function between connective tissue and epithelium. The connective tissue maintains the integrity of the underlying structures by its resistance to mechanical stresses. The epithelium, on the other hand, is a protection in a biological more than in a mechanical sense against chemical and bacterial injuries. The gingiva is attached to the tooth by the gingival group of the principal fibers of the periodontal ligament which are embedded in the cervical edge of cementum and then fan out into the lamina propria of the gingiva. The firmness of this attachment is further reinforced by alveolar and circular fibers of the attached gingiva.

Though the mechanical resistance of the dentogingival junction lies almost entirely in the fibrous attachment, biologically speaking there is the necessity for a sealing off of the gingival sulcus by the attachment of the epithelium to the tooth. The latter appears as a broad junction between an epithelial cuff and the surface of the tooth (Fig. 2).

There seems to be little doubt of the existence of a true attachment of the epithelium to the tooth, though the mode of attachment is still controversial. Gottlieb[12] thought of the epithelial attachment as a persistence of the unquestionable primary union between the ameloblasts and the developing enamel rods. This union was believed not to be dissolved

10. Bernier, J. L. Histologic changes of the gingival tissues in health and periodontal disease. A preliminary report. Oral Surg., Oral Med. & Oral Path. 3:1194 Sept. 1950.

11. Gairns, F. W., and Aitchison, James. Preliminary study of the multiplicity of nerve endings in the human gum. D. Record 70:180 July-Aug. 1950.

12. Gottlieb, Bernhard. Der Epithelansatz am Zahne. Deut. Mschr. Zahnhk. 39:142 March 1921.

after formation and maturation of enamel and after regression of ameloblasts into a reduced enamel epithelium. The opinion was expressed that tonofibrils of the enamel epithelium provide the structural basis for this kind of attachment.[13]

In contradistinction to the idea of the persistence of a primary attachment, Weski[8] has stated his belief in a secondary replacement of the primary union by a cementing substance; namely, the keratinoid secondary enamel cuticle, first observed by Gottlieb.[12]

The assumption of a replacement of a primary union by a secondary attachment led later to the assumption of a possible reattachment of epithelium to enamel after surgical detachment and a possibility of repair of the epithelial attachment by the formation of a new epithelial cuticle under favorable conditions. Baume,[14] Waerhaug,[15-18] Zander,[19] Toller,[20] Manley,[21] Ussing,[22] Bodecker,[23] Macapanpan[24] and Orban[25] have compiled data on the attached epithelial cuff.

Which epithelial cells may be able to produce a cuticular cementing substance and under what conditions is not yet clear. It seems certain, however, that cells that have been exposed at a surface (mature cells) may be able to attach themselves to a tooth surface or even a foreign substance, such as denture implants. It seems, therefore, that it may be possible to expect reattachment of the surface pocket epithelium to the tooth under certain conditions.

PERIODONTAL LIGAMENT, CEMENTUM AND ALVEOLAR BONE

The main structures in the periodontal ligament are collagenous fibers which connect the tooth with the bone. These three structures (cementum, periodontal ligament and alveolar bone) form a functional unit. Every movement of the tooth is transmitted from the cementum to the fibers of the periodontal membrane and thus to the bone.

Every functional change in the relationship between opposing and neighboring teeth will be recorded in the structure of these tissues. A greater or more diminished function than usual will lead to corresponding adaptive structural changes; therefore, between the two extremes of occlusal trauma and loss of function are many intermediate stages.

In loss of function the periodontal membrane becomes narrower. The regular arrangement of the principal fibers is lost, and the periodontal membrane appears as a loose, irregular connective tissue. The cementum becomes thicker and does not contain Sharpey's fibers. The alveolar bone, also, appears aplastic and lacks Sharpey's fibers. For restorative dentistry the importance is obvious. The supporting tissues of teeth out of function are unable to carry the load placed upon the tooth by restorations. This applies to bridge abutments and teeth opposing bridges or dentures. Some time must be allowed to elapse to permit the tissues to adjust and to rearrange again in response to new functional demands.

The alveolar fibers of the periodontal

13. Baume, L. J. Structure of the epithelial attachment revealed by phase contrast microscopy. J. Periodont. 24:99 April 1953.

14. Baume, L. J. Observations concerning the histogenesis of the epithelial attachments. J. Periodont. 23:71 April 1952.

15. Waerhaug, Jens. Gingival pocket. Odont. Tskr. (Suppl. 1) vol. 60, 1952.

16. Waerhaug, Jens; Arno, Arnulf, and Lovdal, Arne. Dimension of instruments for removal of subgingival calculus. J. Periodont. 25:281 Oct. 1954.

17. Waerhaug, Jens. Pathogenesis of pocket formation in traumatic occlusion. J. Periodont. 26:107 April 1955.

18. Waerhaug, Jens. Depth of incision in gingivectomy. Oral Surg., Oral Med. & Oral Path. 8:707 July 1955.

19. Zander, H. A. Method for studying the "epithelial attachment." J. D. Res. 35:308 April 1956.

20. Toller, J. R. Gingival sulcus and the epithelial attachment. Brit. D. J. 84:255 June 18, 1948.

21. Manley, E. B. Nature of the attachment of the oral epithelium to the enamel. Brit. D. J. 61:265, 1936.

22. Ussing, Marie J. Development of the epithelial attachment. Acta odont. scandinav. 13:123 Aug. 1955.

23. Bodecker, C. F. Difficulty of completely removing subgingival calculus. J.A.D.A. 30:703 May 1943.

24. Macapanpan, L. C. Union of the enamel and gingival epithelium. J. Periodont. 25:243 Oct. 1954.

25. Orban, Belint, and others. Epithelial attachment (the attached epithelial cuff). J. Periodont. 27:167 July 1956.

ligament, arranged in strong bundles, serve as the ligamentous suspension of the tooth in its socket. Embedded with one end in the alveolar bone proper and the other in cementum, the single fibers of the bundles are believed to extend uninterrupted through the entire width of the periodontal space. Sicher[26] has pointed out that this theory is untenable. He stated:[26]

> A study of good silver impregnated sections through human teeth shows no single principal fiber can ever be traced from bone to cementum. Instead they all seem to end or begin somewhere in the middle zone of the periodontal membrane. In other words, the single fiber bundles consist of shorter fibers that seem to be "spliced" in their middle. However, it is more correct to state that the human periodontal ligaments also consist of alveolar fibers, dental fibers, and an intermediate plexus. The existence of this plexus escaped our notice for so long because it is quite inconspicuous. This in turn is the consequence of the slow rate of movements in human teeth compared with the fast rate of eruption in rodent incisors and molars. Indeed, Orban described an intermediate plexus in human teeth in the first, fastest phase of eruption before teeth become functional.

Now that the existence of the intermediate plexus in human teeth has been recognized, many questions can be answered. The intermediate plexus offers a site for fiber readjustment which is functional and also for lengthening and shortening of the fibers by fibroblastic activity in this zone. But most important, all these changes occur without loss of old fibers and replacement by new fibers that would involve intensive rebuilding of bone and cementum.

The continual apposition of cementum is not of necessity due to the indispensable need to embed new principal fibers when the old fibers are lost by wear and tear or when they lose functional orientation during continued eruption of teeth. The appositional pattern of cementum is correlated to its relatively short life span, which in all probability is the same as that of bone tissue. While in the latter, overaging leads to resorption of old bone, overaging of cementum leads to the apposition of a new layer of cementum on old layers.

Tooth movement (continuous active eruption and mesial drift) is necessary to create the space for the apposition of new layers of cementum. These tooth movements are in turn correlated to and dependent on normal attrition both of an occlusal and proximal nature.

CONCLUSION

A firm, clear basis of understanding of the normal structural relations of the periodontium is a prerequisite for successful periodontal therapy. In this light, new knowledge of the dentogingival junction and the intermediate plexus of the periodontal ligament may aid in further understanding of the biology and physiology of the attachment apparatus of the teeth.

26. Sicher, H. Principal fibers of the periodontal membrane. Bur 55:2 Dec. 1954.

Lost Thoughts and Theories • The world little knows how many of the thoughts and theories which have passed through the mind of a scientific investigator have been crushed in silence and secrecy by his own severe criticism and adverse examinations. *Michael Faraday, Chemical History of a Candle.*

Maximum forces exerted on the dentition by the perioral and lingual musculature

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There is an increasing awareness among dentists of the influence of the forces of the tongue and lips on the teeth and their supporting structures.[1-4] This includes the functions of the tongue that have to do with chewing, deglutition and acquired habit patterns. Wallace,[5] Rogers,[6] Brodie,[7] Breitner,[8] and others have pointed out that the force of the tongue against the teeth from within the dental arches is normally compensated for by the action of the musculature of the cheeks and lips. The tongue's exerting an abnormal force in relation to the compensating action of the lips may cause migration of the teeth or may contribute to an open bite. If forces generated by the tongue are compensated for by opposing structures within the oral cavity, the masticatory mechanism will be in physiologic balance, but, if the forces exerted by any one structure, for example, the tongue, are in excess of the compensating forces exerted by the other structures of the oral cavity, a change of tooth position might result.

The purpose of this study was to determine the maximum forces that can be exerted by the tongue and the perioral structures on the alveolar process of both the maxilla and mandible and on their respective dentitions and the degree of lateral force exerted in swallowing. The study was made on mouths with no apparent abnormalities due to the forces of the tongue or the perioral structures.

EXPERIMENTAL PROCEDURE

The equipment used in measuring the forces of the tongue consisted of a plastic pressure device of a predetermined size, which was coupled to a Statham pressure transducer (P-23), forming two legs of a Wheatstone bridge, which in turn was attached to an amplifier. The signal emanating from the transducer was recorded by a Brush two-channel pen recorder.

The size of the plastic pressure device was determined by having a series of test subjects impress the tip of the tongue with a maximum amount of force against a piece of absorbent paper placed in the lingual area of the upper anterior teeth and the premaxilla. Prior to this, the tongue was temporarily stained with food coloring so the area of the tongue contacting the paper would be distinctly marked. The same procedure was used in measuring the area of tongue pressure against the lingual area of the lower anterior teeth. The slips of paper marked by the tongue pressure in the maxilla and mandible were flattened and allowed to

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Clinical assistant, department of prosthodontics, University of Washington School of Dentistry.

1. Tisdale, E. A. Treatment of open-bite cases associated with tongue habit. Internat. J. Orthodont. 21:1056 Nov. 1935.

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6. Rogers, A. P. Muscle training and its relation to orthodontia. Internat. J. Orthodont. 4:555 Nov. 1918.

7. Brodie, A. J. Biologic aspects of orthodontia. In Dental science and art, Gordon, S. M., editor. Philadelphia, Lea & Febiger, 1938, p. 104.

8. Breitner, C. Tooth-supporting apparatus under occlusal changes. J. Periodont. 13:72 July 1942.

dry. Afterward the average area was computed and an average outline was determined (Fig. 1). Then the series of pressure devices were constructed to the dimensions of both the upper and lower tongue outlines. The reason care was taken in determining the size of the pressure devices was because the total pressure the tongue can exert was to be measured pounds per square inch (psi). If the pressure device had been too small, the tongue would have been resting on adjacent tissue when exerting maximum force. If the diaphragm had been too large in area, it would have restricted the tongue's ability to move or to exert a maximum force.

The plastic pressure device was made of a .004-inch sheet of vinyl plastic (Fig. 2). The .004-inch sheet was heavy enough not to distort visibly within the pressure range for which it was constructed (from 0 to 15 pounds per square inch). In a previous investigation it was found that a painful response was elicited when the tongue was repeatedly thrust anteriorly against a rigid surface less than 15 by 15 mm. when it contacted nothing else.[9] (If a test subject were to thrust the tongue repeatedly with maximum effort against a surface, as small as 5 by 8 mm., for example, it was found that a painful response would be elicited very shortly.) The only other alternative would be that the patient would not exert a maximum force, as the threshhold of pain would be reached before maximum force was exerted.

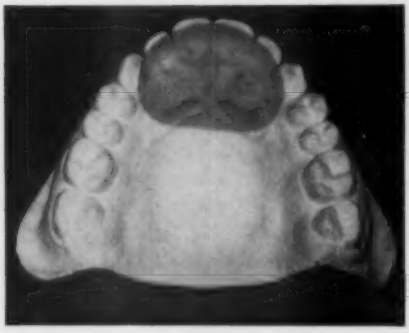

Fig. 1 • Outline of area covered by tongue when exerting maximum pressure against teeth

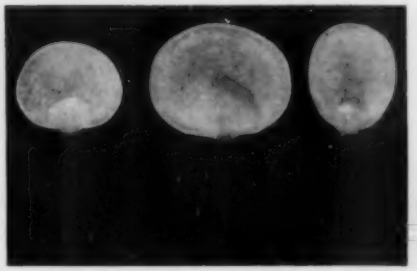

Fig. 2 • Pressure devices used for recording, left, pressure of tongue on lingual area of lower mandibular incisors and upper and lower lip pressures, center, pressure of tongue on lingual area of upper maxillary incisors and adjacent tissue and, right, tongue pressures in area of first and second molars

It is good to realize that all pressure devices used in testing of this sort are subject to some criticism, but the type employed in this study was thought to incorporate fewer deficiencies than the other types presently available for this specific use.

The thickness of the pressure device is a paramount consideration. The aim in design, therefore, is to keep the walls of the pressure device thin to simulate the normal mouth as closely as possible. Initially, the pressure devices were filled with air, but this plan was discarded because of the difficulty in calibration caused by temperature changes increasing and decreasing the air pressure. Then water, alcohol and various oils were tried, but water proved to be the best material for transmitting pressure changes quickly and reliably.

9. Kydd, W. L. Quantitative analysis of forces of the tongue. J. D. Res. 35:171 April 1956.

Just before use, the electronic equipment was tested for drift by coupling a sphygmomanometer to the pressure transducer and checking the amplitude of the wave on the recorder with the pressure in millimeters of mercury needed to produce this wave. This was done prior to and at the conclusion of pressure testing on subjects. If the results were not identical with the sphygmomanometer reading both before and after testing when a pressure of a given number of millimeters of mercury was applied, the results were discarded.

The subject was seated in a comfortable upright position, the pressure unit was placed in his mouth, and he was asked to exert a maximum amount of force on the pressure unit. The subject was then asked to repeat this exertion of maximum force a total of five times to make sure that the pressure device was correctly placed and to insure against any artifacts in the recordings. An artifact, such as a fold in the pressure device, could easily alter a single recording. The number of tests was restricted to five because of the factor of muscular fatigue.

In recording a series of maximum-pressure efforts, it was found that the tongue became fatigued after 35 maximum-pressure efforts and showed the first indication of fatigue after 5 such efforts in all 10 subjects tested.

In general, the literature reveals an awareness of the relation of tongue habits and macroglossia and malocclusion. Therefore, all test subjects were screened for macroglossia, hyposensitive uvula, hyposensitive palate and any gross abnormality of the tongue and oral cavity. The occlusions in 28 patients were classified clinically within Angle's Class I malocclusion group, and the occlusions in 2 patients were classified within the Class II, Division 2. The latter two patients were not omitted from the study because the testing was to be done with the subject's mouth in a partially open position.

DEFINITION OF STATISTICAL MEASUREMENTS USED

The range, a measure of variability, is computed by taking the difference between the highest and the lowest measurement.

The median is computed by arranging the individual measurements in an array (from lowest to highest) and taking the midpoint as the median. The median, unlike the range and the mean, is not greatly influenced by extreme values. In the sample of 30 dental students tested, the median fell between the measurements in fifteenth and sixteenth patients.

The arithmetic mean, commonly called the mean, is computed by adding the measurements and dividing by the number of individual measurements.

The standard deviation (σ) is computed by a formula, in which Σ indicates sum of, x is the individual measurements and n is the number of measurements. It is the most important statistical measurement of dispersion.

$$\sigma = \sqrt{\frac{\Sigma x}{n} - \left(\frac{\Sigma x}{n}\right)^2}$$

The coefficient of variation or coefficient of variability is computed by dividing the standard deviation by the mean and multiplying the result by 100. The coefficient of variation is useful in comparing the relative dispersion of the various sample measurements.

The standard score (z) is computed by taking the difference between a particular individual measurement (x) and the mean of a sample ($\bar{x}$) and dividing the result by the standard deviation of that sample (s). This is useful in determining where that particular measurement falls in relation to the area under the normal curve. The z score means that a z score of 1.96 will occur only 50 times in 1,000 instances when observations are made in a normal population.

The z score is computed in order to see which measurements of each group would lie outside of a z score of ± 1.96. This is a 0.05 level of significance. In order to do this ± 1.96 was substituted into the following formula in place of z to determine x:

$$z = \frac{x - \bar{x}}{s}$$

RESULTS

The results in the 30 subjects tested are given in the table.

The median of the maximum pressures of the tongue against the upper anterior teeth and the anterior alveolar portion of the maxillaes was 8.05 psi (562.3 Gm. per square centimeter 3650.6 Gm. per square inch). The median of the maximum forces exerted against the lower anterior teeth and the anterior alveolar portion of the mandible was 5.7 psi (399.9 Gm. per square centimeter). The median of the maximum amounts of force exerted in the area of the first and second molar and the alveolar process of the mandible was 1.3 psi on the left side and 1.3 psi on the right side (90.7 Gm. per square centimeter). The median of the maximum forces exerted by the upper lip against the alveolar process and maxillary anterior teeth was 4.4 psi (308.3 Gm. per square centimeter) and the median of those exerted by the lower lip against the mandibular anterior teeth and alveolar process was 4.1 psi (285.7 Gm. per square centimeter).

COMMENT

The tongue in normal swallowing is in such a position that its dorsal surface is in contact with the hard and soft palates, exerting its pressure against them in an upward and lateral direction. Its tip and edges do not protrude between the teeth at any point. The tip of the tongue does not come forward any further than the lingual gingival third of the maxillary incisors.

The results of the statistical analysis are valid and lie within the range of probability, that is have a 25 in 1,000 chance of occurring, with the exception of swallowing pressure on the left mandibular first and second molar area. It is good to note that the measurements in the left mandibular first and second molar area have the lowest mean and standard deviation, which may result from the fact that 14 measurements were at the 1.3 psi level and 10 measurements were at the 1.9 psi level. The forces of both the lip and the tongue, if unopposed by each other, appear to be great enough to move teeth. This is based on the experimental finding of Schwarz[10] that dog's teeth can be moved with gentle continuous spring forces (3 — 5 Gm. or .0066 to .0110 pounds).

Forces of this magnitude would tend to limit the foods which according to O'Rourke[11] could be crushed against the rugae and the hard palate by the tongue of the patient completely or partially without teeth.

The hypothesis of Rogers[6] and Breitner,[8] that the force of the tongue from within the dental arches is normally compensated for by the action of the musculature of the lips and cheeks is not substantiated by this investigation. The pressures exerted by the tongue (8.05 psi) were found on experimentation to be greater than the pressures exerted by the lips (4.4 psi).

Again, other forces which tend to equalize this apparent imbalance of musculature may be brought into play. These forces may include the inclination of the teeth, the density and thickness of alveolar bone, the length of the tooth roots,

10. Schwarz, A. M. Tissue changes incidental to orthodontic tooth movement. Internat. J. Orthodont., Oral Surg. & Radiog. 18:331 April 1932.

11. O'Rourke, J. T. Oral physiology. Mimer, L. M. S., editor. St. Louis, C. V. Mosby Co., 1951, p. 304.

Table • Data on pressures exerted by lingual and perioral musculature on dentition

Patient	Age as of 6-1-56	Pressure psi					
		Tongue against		Swallowing: 1st and 2nd mandibular molar area		Lip pressure	
		Maxillary anterior teeth	Mandibular anterior teeth	Right	Left	Lower	Upper
1	24	9.0	6.3	1.9	1.3	6.3	5.0
2	25	8.7	7.0	3.8	1.9	5.0	3.8
3	24	7.0	4.4	1.3	1.3	6.3	4.4
4	24	6.3	3.8	1.9	1.9	3.8	2.5
5	22	7.6	5.0	1.3	1.3	1.9	2.5
6	30	8.7	6.3	1.9	1.3	3.8	5.0
7	30	8.5	4.4	3.8	2.5	5.7	6.3
8	25	8.1	6.3	1.3	1.9	5.7	5.7
9	26	9.8	5.0	1.3	1.9	3.1	3.8
10	25	9.4	7.0	1.9	1.3	6.3	5.0
11	24	8.7	6.3	1.9	1.9	3.8	5.7
12	34	6.3	5.7	3.8	1.3	1.9	1.9
13	25	8.1	2.5	1.3	1.9	3.8	5.7
14	22	9.8	4.4	2.5	3.8	3.1	3.8
15	23	9.4	7.0	1.9	1.9	4.4	3.1
16	23	7.0	5.0	1.3	2.5	1.9	4.4
17	24	5.7	5.0	0.66	1.3	3.8	4.4
18	22	7.0	7.0	1.3	1.3	4.4	5.7
19	27	8.7	7.0	1.3	0.66	2.5	2.5
20	23	5.7	7.0	1.9	1.9	3.1	1.9
21	22	8.0	6.3	0.66	0.66	1.33	2.5
22	27	9.7	5.7	2.5	1.3	4.4	3.8
23	24	9.0	5.0	1.3	1.3	3.1	3.8
24	33	8.0	5.0	1.3	1.9	5.0	6.3
25	21	6.3	3.8	0.6	0.6	3.8	5.0
26	22	6.9	6.3	1.3	1.3	5.0	5.0
27	26	6.3	5.0	1.3	1.9	5.0	3.8
28	29	6.9	5.7	1.9	1.3	5.7	6.3
29	26	7.0	5.0	1.9	1.3	5.0	5.0
30	30	9.9	5.7	1.3	1.3	5.7	4.4
Totals	762	237.5	165.9	52.32	47.92	124.6	129.0
Median	24	8.05	5.7	1.3	1.3	4.1	4.4
Mean	25.4	7.92	5.53	1.74	1.60	4.15	4.3
Standard deviation		1.26	1.12	0.83	0.37	1.41	1.29
Range	13	4.2	4.5	3.2	3.2	4.97	4.4
Coefficient of variation		15.9	20.25	47.7	23.12	33.97	30.0

the length of the clinically apparent crowns, and the forces of occlusion. The lips may exert a lower pressure for a longer duration than the tongue. These speculations provide worthy material for subsequent investigation.

SUMMARY

A comparative study to evaluate statistically the average maximum forces exerted by the tongue and perioral structures was made in a series of 30 male dental

students, with a mean age of 25.4 years. The greatest maximum force was 8.05 pounds per square inch (psi), which was recorded when the tongue was pressed against the lingual aspect of the upper anterior teeth. The least maximum force was 1.3 psi which was exerted by the tongue against the lower first and second molar area.

712 General Insurance Building

Results of several types of treatment of periodontosis

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In previous studies[1-4] of patients with periodontosis, it was reported that this disease occurs predominantly in females during adolescence and early maturity. The roentgenograms in these patients showed signs of severe alveolar bone loss in the first molar and incisor regions. In the molar region, the bone loss presented an arc-like contour and extended from the distal aspect of the second bicuspid to the mesial aspect of the second molar. In advanced instances of the condition which occurred during adolescence, the bone loss was generalized and was least pronounced in the bicuspid region, especially in the mandible. Local factors[2] generally associated with periodontal disease were either absent or not prominent and apparently did not account for the severe loss of alveolar bone.

When the disease occurs at an early age, the damage to the supporting tissue is progressive and rapid. The four series of roentgenograms taken of a 14 year old girl at yearly intervals demonstrate this point (Fig. 1). Her original complaint was that the first molars were loose. Three of these were extracted prior to the taking of the first roentgeno-

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The thiamine hydrochloride, riboflavin, nicotinamide and ascorbic acid used in this investigation were supplied in the form of a tablet by E. R. Squibb and Sons.

The folic acid was supplied by the American Cyanamid Company.

The methylandrostenediol used in this investigation was supplied by the Schering Corporation.

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§Guest investigator, School of Dental and Oral Surgery, Columbia University, and fellow in endocrinology, Mt. Sinai Hospital.

‖Clinical professor of dentistry, School of Dental and Oral Surgery, Columbia University.

1. Tenenbaum, B., and Karshan, M. Blood studies in periodontoclasia. J.A.D.A. 32:1372 Nov.-Dec. 1945.

2. Karshan, M., and others. Blood studies in periodontoclasia. J. D. Res. 25:247 Aug. 1946.

3. Tenenbaum, B., and others. Clinical and microscopic study of the gingivae in periodontosis. J.A.D.A. 40:302 March 1950.

4. Karshan, M., and others. Studies in periodontal disease. J. D. Res. 31:11 Feb. 1952.

graphic series, but no further dental treatment was given. At the initial examination, the loss of alveolar bone was predominantly in the first molar and incisor regions. As the teeth drifted and local irritating factors were introduced, the condition was aggravated, causing inflammation and further loss of alveolar bone throughout the mouth. There was lateral migration and labial protrusion of the upper anterior teeth. The lower anterior teeth elongated, and the right central and lateral incisors exfoliated during the period of observation.

It was reported previously that it does not appear that a common systemic condition operates as a modifying or predisposing factor in periodontosis.[4, 5] From available information, it is not possible to detect and correct any systemic condition that may be responsible for this disease. This makes the prognosis of periodontosis extremely poor, especially in patients with advanced conditions and tooth mobility.

Clinical studies, including data on the treatment of groups of patients with periodontosis, have not been reported as yet in the literature. In anticipation of the possibility that data on treatment might throw light on the etiology of periodontosis, this study was undertaken.

METHOD

The patients were divided into five groups. Those in Group 1 received local dental treatment and were given vitamins, calcium and phosphorus. Local treatment consisted of root and soft tissue curettage, selective tooth grinding, periodontal surgery and instruction in oral hygiene. During the last 7 to 13 months of dental treatment, the patients received vitamin-calcium-phosphorus therapy. The daily dosages were 15,000 U.S.P. units of vitamin A, 2,400 units of vitamin D, 6 mg. of thiamine hydrochloride, 9 mg. of riboflavin, 60 mg. of nicotinamide, 30 mg. of calcium pantothenate, 6 mg. of pyridoxine hydrochloride, 3 mg. of folic acid, 0.1 mg. of biotin, 225 mg. of ascorbic acid and 2 Gm. of dibasic calcium phosphate.

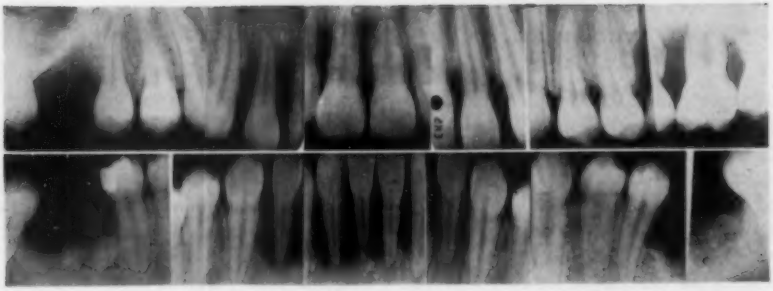
Fig. 1 (opposite page) • Progress of disease. Increasing rarefaction and thinning of interdental bone, with irregular and ragged contour. Rarefaction and disintegration of cortical bone of lamina dura even in bicuspid region. First and second rows: Taken of girl at age 14. Third and fourth rows: At age 15. Fifth and sixth rows: At age 16. Seventh and eighth rows: At age 17

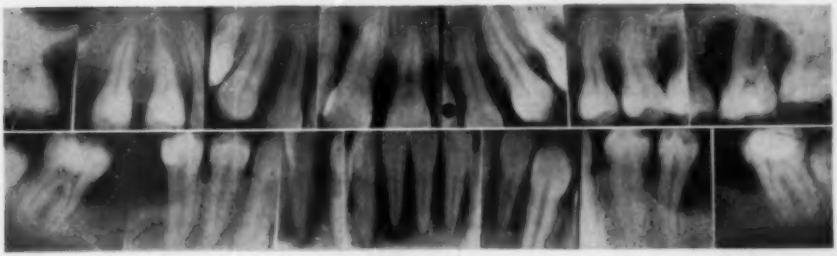
The patients in Group 2 received local dental treatment similar to that given to the patients in Group 1, without vitamin-calcium-phosphorus therapy. Those in Group 3 received only vitamin-calcium-phosphorus therapy. No dental treatment was given in this group.

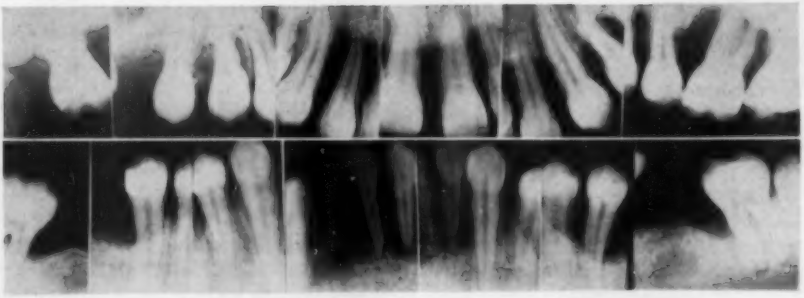
In view of the striking benefits obtained in patients with postmenopausal and senile osteoporosis with androgen and estrogen therapy, it was decided to try hormone therapy in one group, which consisted of 13 females ranging in age from 13 to 39. The steroid methylandrostenediol was used to avoid the development of menstrual disturbances which may occur after estrogen therapy and the possible masculinizing effects of testosterone therapy. Methylandrostenediol has been found to be effective in promoting anabolism, and, with this drug, there is a reduced possibility of masculinizing changes occurring. Each subject in Group 4 was given 50 mg. of the hormone a day orally, and a full series of roentgenograms was taken at intervals of three months for a period of from six months to one year.

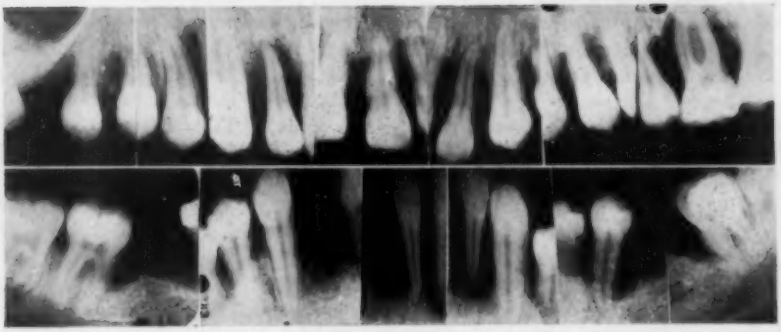
The patients in Group 5 were treated with experimental splints constructed by

5. Karshan, M. Systemic factors in periodontal disease. J.A.D.A. 44:656 June 1952.









soldering together 0.004-inch thick, stainless steel orthodontic bands. Where teeth were missing, the space was bridged with a length of 0.04-inch wire soldered to the bands on either side of the space. When this type of splint is cemented in place, it is rigid and will stabilize the teeth for a period of six months or longer, provided it has been adjusted so that it is free of the occlusion.

The insertion of the splint depends on a slight separation or mobility of the teeth, which was present in these patients. The disadvantages of this method are that the splints are not esthetic and that they require meticulous hygienic care of the mouth.

The patients treated by splinting had been treated previously by one or more of the procedures described for the other groups. During the time the splints were in place, the patients received no dental treatment, but they were instructed in home hygiene.

EVALUATION

To evaluate the results of treatment, a full-mouth series of roentgenograms, color photographs of the dentition and gingiva and alginate impressions for study models were made. Also clinical examination was made before and after treatment. A chart was used for recording observations and measurements (Fig. 2).

In the clinical examination, deviations from the normal in the interproximal papillae were given a grade of 1 for the presence of gingivitis or suppuration or for loss or enlargement of the papillae. Mobility was graded 1, 2 or 3 depending on the degree. The pocket depth on each surface of the tooth was measured in millimeters with a graded probe. These individual values were averaged to obtain a mean pocket depth for the entire mouth.

In interpreting the roentgenograms, the following factors were considered and graded: the periodontal space, 1. indefinite (not seen around the length of the root), 2. definite, 3. thickened and 4. increase in width of the periodontal space; the contour of the alveolar crest, 1. pointed, 2. blunted and smooth, 3. blunted and ragged or irregular, 4. blunted and rarefied and 5. infrabony pocket; and the lamina dura, 0. absent and 1. present at the alveolar crest.

In addition, the percentage of bone resorption was based on a comparison of the length of complete alveolar bone loss and the full length of the root. With a millimeter ruler, the mesial and distal surfaces were measured in an apical direction from the cementoenamel junction to the nearest shadow of alveolar bone, and the average of these two measurements was divided by the distance from the cementoenamel line to the apex of the root. These percentages for individual teeth were averaged to obtain a single value for the entire mouth.

All the roentgenograms were taken by the division of radiology, School of Dental and Oral Surgery, Columbia University. No attempt was made to standardize or change the division's routine technic. It is quite possible that the same area may appear slightly altered on the different roentgenograms because of a different exposure time or a change in angulation. Since the examination was for gross changes and several series were taken of each patient during the period of observation, it was felt that any minor discrepancies would balance themselves over a period of time. To reduce possible subjective errors, only one of us (B.T.) compared all the roentgenograms, using the standards mentioned previously. The clinical examinations were performed by two of us (B.T. or H.I.N.).

In Group 1, in addition to the clinical and roentgenographic examination, a biopsy was made for histological study of the interdental papillae between the upper left cuspid and the first bicuspid in 17 of the 19 subjects. In the histological

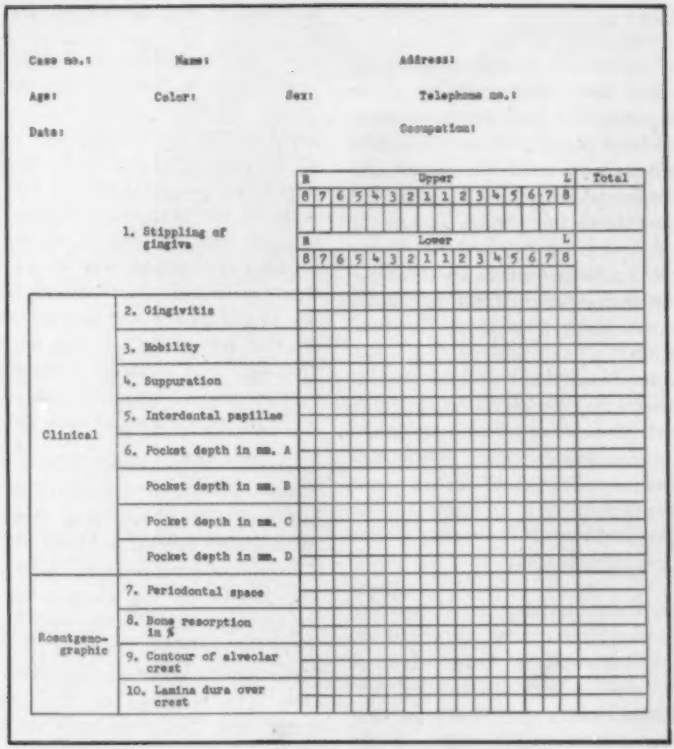


Fig. 2 • Chart used for recording observations. Stippling: 0, present, and —1, absent. Gingivitis: 1, marginal or enlargement. Mobility: 1, slight; 2, moderate, and 3, pronounced. Suppuration: 1, present. Interdental papillae: 1, destroyed or enlarged. Pocket depth in millimeters: A, mesial; B, distal; C, labial or buccal, and D, lingual. Periodontal space: 1, indefinite; 2, definite around entire embedded portion of root; 3, thickened, and 4, increase in space. Bone resorption: percentage based on length of complete alveolar bone loss compared with full length of root. Contour of alveolar crest: 1, pointed; 2, blunted and smooth; 3, blunted and ragged; 4, blunted and rarefied, and 5, infrabony pocket. Lamina dura: 0, absent at alveolar crest, and 1, present at alveolar crest

comparison, the same standards were used as in a previous study.[3] The epithelium and the subepithelial tissues were examined, and any deviations from normal were recorded on the chart.

RESULTS

Group 1 • Group 1 consisted of 18 females and 1 male ranging in age from 14 to 38 years. The patients were under treatment for a period of from 10 months to 25 months and received vitamin-calcium-phosphorus therapy during the last 7 to 13 months of this period. Ten of the patients lost one or more teeth during the 10-to-25-month period. In these patients, the comparative study was made only on the teeth present at the final examination.

The data from the roentgenographic examinations on the presence of gingivitis, on the condition of the interdental papillae, on mobility, on the presence or absence of stippling and on the mean pocket depth are given in Table 1. This table also includes the results of the microscopic examinations.

Clinical Examination • In 31 per cent of the patients, stippling appeared on clinical examination in areas where it was absent before periodontal treatment and vitamin-calcium phosphorus therapy. There was some improvement in the clinical appearance of the gingiva in 65 per cent of the patients. Suppuration and pocket depth were somewhat reduced in 84 per cent and 78 per cent of the patients respectively. Forty-seven per cent of the patients showed a decrease in tooth mobility.

Histological Examination • In 64 per cent of the patients, there was some improvement in either the epithelium or the subepithelial tissues or in both as shown by histological examination. In these patients there was a reduction in the number of inflammatory cells and an improvement in the appearance of the outer layer of the epithelium. The clinical examination demonstrated an improvement in the soft tissue surrounding the teeth in many of the subjects studied, and, as a rule, this was reflected in improved histological appearance of the gingiva.

Roentgenographic Examination • In contrast to the results of the examination of the soft tissue, there was no improvement except in one patient (no. 19) at the alveolar crest and in the lamina dura over the crest and there was less improvement in the periodontal space. The disease in this patient as shown by the initial examination was in an incipient stage, with only moderate alveolar bone loss in the incisor and first molar regions. In the remainder of the patients, the alveolar crest showed progressive rarefaction and irregularity and there was widening of the periodontal space.

Group 2 • The seven patients in Group 2 were given local treatment without vitamin-calcium-phosphorus therapy. The results were similar to those in Group 1. There was improvement in the clinical appearance of the gingiva and pocket depth was reduced somewhat in a majority of the patients. There was no improvement on the roentgenographic examination. The readings on the periodontal space and the alveolar crest were increased indicating continued progress of the disease.

An 11 year old girl who had been observed for five and one half years was given local dental treatment for four years. Then, for a period of ten months, she was given hormone therapy. Later, this patient was treated by splinting. Roentgenographic series in this patient (no. 23) are shown in Figure 3.

Group 3 • In the ten patients in Group 3 vitamin-calcium-phosphorus therapy was given for a period of from 6 to 10 months without dental treatment. On the

basis of roentgenographic and clinical examination, no appreciable change from the condition seen on the initial examination was noted after the treatment period. Seven of the 10 patients gained weight during the period of observation.

Group 4 • In general, the patients in Group 4, who were given hormone therapy with methylandrostenediol, exhibited increased appetite and gained weight, suggesting anabolic stimulation. The data for this group are given in Table 2. It is evident that the hormone had very little effect in arresting the progress of the disease as is seen in roentgenograms in patient no. 23 (Fig. 3, seventh and eighth rows).

Group 5 • Six women, ranging in age from 16 to 38, have been treated by splinting thus far. In contrast to the results obtained in the other four groups, the most striking change occurred in the roentgenographic findings (Table 3). In every patient, according to the interpretation of the findings, there was slight improvement in the periodontal space and pronounced improvement at the alveolar crest. In most regions, the irregular and ragged contour of the alveolar crest became smooth and many of the rarefied regions were filled in (Fig. 4, first and second rows, and Fig. 5, third and fourth rows). In five of the six patients, there was an increase in the number of regions with lamina dura at the crest.

In spite of the visible improvement in the roentgenograms in these patients, there was little change in the percentage of total alveolar bone loss before and after treatment. There is some indication that, if the observations had been continued for a longer period, there would have been a greater deposition of alveolar bone, since five of the six patients showed a small increase in the percentage of alveolar bone present.

These improvements in the roentgenographic findings did not correspond with the results as revealed by clinical examination of the soft tissue. Since the patients had difficulty in keeping their mouths clean with the splints in place, three of the six patients showed an increase in the gingival inflammation and the pocket depth.

One patient (no. 23) who had been given local dental treatment and hormone therapy previously was treated with an experimental mandibular splint at the age of 16 (Fig. 4, below). Roentgenograms taken five months after splinting showed the development of new lamina dura (Fig. 4, first and second rows).

Another patient (no. 30) was 17 years of age at the time of splinting (Fig. 5, below). The maxillary splint was inserted without cementation just prior to periodontal surgery. The splint was cemented in place several days after the completion of surgery. No dental treatment was given the patient during the 12 month observation period. Roentgenograms were taken before splinting (Fig. 5, first and second rows) and after the splint had been in place for one year (Fig. 5, third and fourth rows).

COMMENT

The results in Groups 1 and 2 indicate that local dental treatment with or without vitamin-calcium-phosphorus therapy improved the clinical appearance of the soft tissue surrounding the teeth in a majority of the patients with periodontosis. There was a reduction in the pocket depth due to shrinking of the tissue, with a more normal appearing gingiva and a somewhat reduced tooth mobility. The roentgenographic examination did not show a comparable improvement in the changes in the alveolar bone or the periodontal space. In Group 3 in which vitamin-calcium-phosphorus therapy was used and in Group 4 in which methylandrostenediol therapy was used, there was no appreciable improvement as shown

Table 1 • Results of local treatment and vitamin-calcium-phosphorus therapy (group 1)

Patient*	Sex and age	Date	Local treatment		Duration of vitamin-calcium-phosphorus therapy in mo.	Roentgenographic examination‡			
			Type†	No. of visits		No. of teeth present	Periodontal space	Alveolar crest	
								Contour	Lamina dura
1 B	F 34	10/14/48	C, G, OH	12	7	23	56	50	0
A	35	3/17/50				22	60	53	0
2 B	F 17	3/19/49	C, G, OH	19	11	29	57	53	6
A	19	12/16/50				29	58	59	2
3 B	M 37	10/23/48	C, G, OH	19	12	29	62	70	0
A	39	6/ 8/50				24	66	72	0
4 B	F 36	10/26/48	C, G, OH	20	8	32	52	57	2
A	38	11/17/50				23	49	51	2
5 B	F 16	5/14/50	C, G, OH	19	13	26	66	57	6
A	18	5/ 1/52				26	70	60	6
6 B	F 31	2/18/49	C, G, OH	14	12	29	61	67	0
A	32	6/16/50				28	65	69	0
7 B	F 25	2/25/49	C, G, OH	15	11	30	70	71	0
A	26	5/26/50				29	71	65	0
8 B	F 34	5/27/49	C, G, OH	18	13	26	69	75	1
A	36	5/25/51				22	77	89	1
9 B	F 31	12/ 5/49	C, G, OH	18	9	29	17	22	0
A	33	1/ 2/52				8	22	25	0
10 B	F 26	11/25/49	C, G, OH	13	12	24	58	65	2
A	27	3/20/51				23	66	71	1
11 B	F 30	12/ 9/49	C, G, OH	13	12	31	69	75	5
A	31	1/ 2/51				31	70	74	7
12 B	F 38	12/16/49	C, G, OH	15	9	24	41	35	0
A	39	5/ 1/51				15	42	34	0
13 B	F 29	1/13/50	C, G, OH, S	14	12	26	60	72	0
A	30	5/ 1/51				26	72	76	0
14 B	F 22	2/ 3/50	C, G, OH, S	14	12	31	73	76	4
A	23	6/21/51				31	86	83	3
15 B	F 27	2/26/50	C, G, OH, S	12	9	28	65	69	6
A	28	6/15/51				28	64	78	4
16 B	F 30	3/ 3/50	C, G, OH, S	19	12	27	64	62	0
A	31	5/18/51				26	68	68	0
17 B	F 36	3/24/50	C, G, OH, S	15	9	27	56	45	0
A	37	6/21/51				18	60	50	0
18 B	F 30	5/19/50	C, G, OH	16	8	29	60	66	1
A	31	3/19/51				29	60	66	0
19 B	F 14	5/12/50	C, G, OH	16	12	28	65	59	6
A	15	12/14/51				28	63	52	14

*B—before treatment, A—after treatment.
†C—curettage, G—selective tooth grinding, OH—instruction in oral hygiene, S—periodontal surgery.
‡See legend to Figure 2.
§O—little or no change, X—increase in no. of degenerated cells, +—improvement of cells.
‖O—little or no change, X—increase in cellular infiltration and edema, +—improved, less cellular infiltration.

Table 1 • (Continued)

Clinical examination‡						Microscopic examination	
Stippling	Gingivitis	Suppuration (finger pressure)	Interdental papillae	Mean of pocket depths of all surfaces in mm.	Tooth mobility	Epithelium§	Subepithelial tissues‖
U 0 L −1	7	8	6	4.41	6		
U 0 L −1	3	6	7	4.13	18	0	0
0	5	3	2	2.61	2		
0	4	4	7	3.56	4	+	0
0	3	5	11	4.76	22		
0	0	1	10	3.63	23	0	0
0	18	6	18	3.15	19		
0	10	5	10	3.03	15	×	×
−1	0	0	0	3.06	0		
−1	0	0	0	2.56	0	0	0
−1	6	5	17	4.46	8		
U 0 L −1	0	2	18	4.00	12	0	+
−1	21	18	7	4.15	13		
0	6	0	18	3.00	2	−	−
−1	8	7	0	5.00	6		
−1	0	2	0	3.87	3	+	0
0	0	1	0	4.06	0		
0	0	0	0	2.90	3	+	+
−1	8	13	4	5.29	9		
−1	8	4	4	4.36	10	0	+
−1	11	13	8	4.29	7		
−1	8	12	8	4.37	8	−	−
−1	3	2	10	3.93	12		
−1	5	1	3	2.60	7	0	+
−1	8	10	11	4.82	9		
−1	9	4	7	3.97	7	+	+
−1	6	9	6	4.32	10		
U −1 L 0	0	1	7	3.37	14	0	+
−1	0	3	7	4.75	33		
−1	0	0	6	3.75	28	0	+
−1	11	18	14	3.06	10		
U 0 L −1	3	2	11	2.29	8	0	+
−1	2	6	3	4.05	18		
−1	0	5	4	4.28	18	+	+
U 0 L −1	4	0	15	2.58	3		
U 0 L −1	3	0	19	2.70	0	0	0
−1	9	10	4	2.65	12		
0	2	0	0	2.38	2	0	0

by clinical and roentgenographic examination.

It is evident that in the series of patients with periodontosis studied neither local dental treatment, such as the elimination of local irritants, periodontal surgery and selective tooth grinding nor vitamin-calcium-phosphorus nor methylandrostenediol therapy were sufficient to establish and maintain periodontal health (Fig. 3).

Fig. 3 (opposite page) • Continuing progress of disease in spite of local periodontal treatment and hormone therapy in patient no. 23. First and second rows: Taken of patient at age 11. Third and fourth rows: At age 14. Fifth and sixth rows: At age 15. Seventh and eighth rows: At age 16

To decrease the stress on the individual tooth and to stabilize any labiolingual and buccolingual movements and prevent further drifting, temporary fixed splinting utilizing all the natural teeth present in either the maxilla or mandible was attempted in the patients in Group 5 (Fig. 4, below, and Fig. 5, below). The first indication that the condition of the tissue was brought within physiologic balance was seen roentgenographically at the alveolar crest. The ragged edges of the crest became smooth, the rarefied areas filled in and new lamina dura appeared apically to its normal position. This occurred in many areas in all the patients whose teeth were splinted, whether the gingiva showed signs of inflammation or not. Even when the degeneration of the alveolar bone extended to the apex of the root and the tooth was so loose that the splints had to be inserted with great care for fear of accidental loss of teeth occurring, there was definite repair of the supporting tissues of the teeth once they were stabilized, as seen in the left maxillary lateral incisor and first molars in Figure 5, below.

On the basis of this evidence of repair of the periodontal tissues around teeth, the prognoses of which were considered to be hopeless, a tooth should not be condemned until its response to stabilization and treatment is known. This is in accord with clinical observations made in 1951.[6] At that time several patients with periodontosis and periodontitis whose conditions were considered hopeless from a reconstructive viewpoint were treated. By the use of fixed splints, whenever possible, and by replacing the missing posterior teeth with a partial denture with internal precision attachments, conditions were established in many patients that arrested the process of alveolar bone loss over a period of years. Instances of repair of alveolar bone by the use of extensive fixed splints in conjunction with periodontal treatment in patients with advanced periodontitis have been reported by Beube.[7]

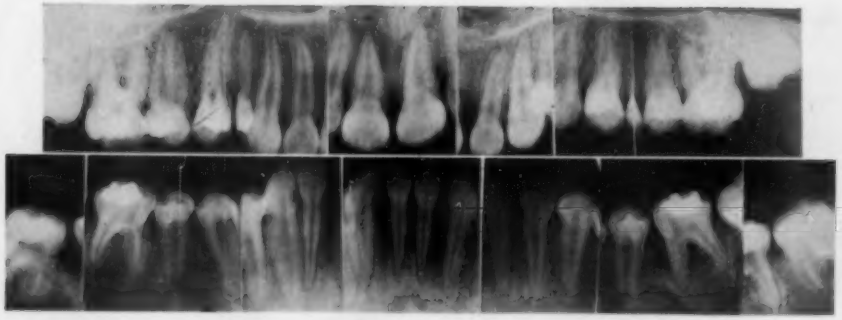
The use of a fixed bridge, constructed as a rigid unit extending from the right second molar to the left second molar, was found to be effective in reducing the stresses to the periodontal tissues, which were brought within physiologic balance, in a typical patient not included in Group 5. To improve the appearance, acrylic-faced, cast-gold crowns were used on all the abutment teeth up to the second molars. Photographs of this patient, who was treated with a fixed bridge at the age of 26, are shown in Figure 6. Roentgenograms in this patient are shown in Figure 7.

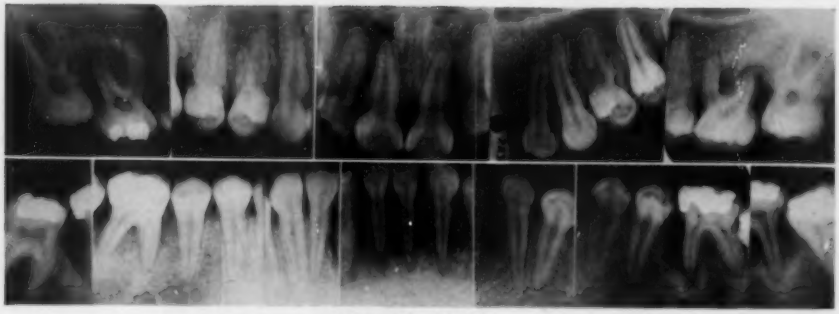
SUMMARY

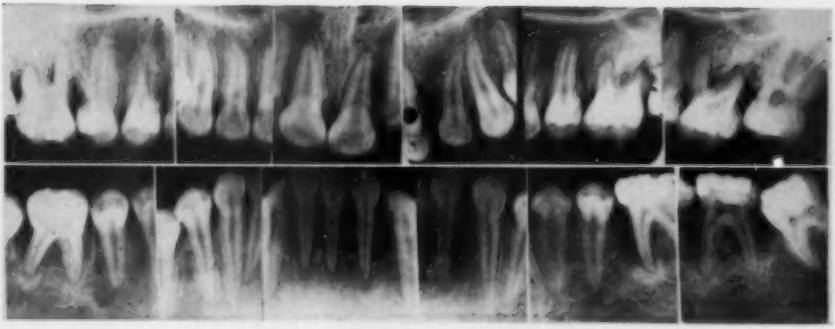
Patients with periodontosis were divided into five treatment groups and the results

6. Tenenbaum, B. Diagnosis, etiology and treatment of periodontosis and periodontitis. (Abst.) New York J. Den. 21:265 June-July 1951.

7. Beube, F. E. Periodontology: diagnosis and treatment. New York, Macmillan Co., 1953, chap. 18, p. 452-497.







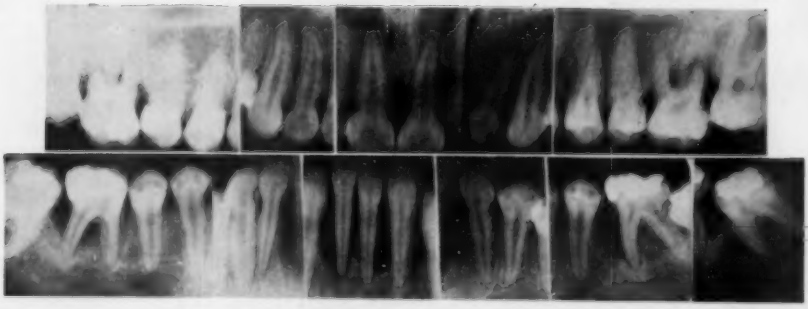


Table 2 • Results of treatment with methylandrostenediol (group 4)

Patient*	Sex and age	Date	Roentgenographic examination†				Clinical examination†					
			No. of teeth present	Periodontal space	Alveolar crest		Stippling	Gingivitis	Suppuration (finger pressure)	Interdental papillae	Mean of pocket depths of all surfaces, mm.	Tooth mobility
					Contour	Lamina dura						
5 B	F 18	5/ 1/52	26	70	60	6	−1	0	0	0	2.56	0
A	19	6/19/53	26	76	66	6	−1	0	0	0	2.42	0
20 B	F 35	10/ 7/52	25	73	75	1	−1	8	16	8	3.96	17
A	36	6/12/53	25	79	79	1	−1	15	8	10	3.55	16
14 B	F 24	7/ 8/52	31	87	83	3	0	2	1	7	3.97	14
A	25	6/26/53	31	89	83	3	0	4	0	9	4.14	12
15 B	F 29	9/25/52	28	68	79	3	−1	0	0	6	3.85	28
A	30	5/29/53	28	69	76	3	−1	0	2	7	3.89	22
17 B	F 38	12/ 3/52	9	26	20	0	−1	0	0	0	3.05	3
A	39	6/ 6/53	9	26	21	0	−1	0	0	3	3.69	5
21 B	F 33	9/23/52	28	70	75	2	−1	0	0	0	3.37	0
A	34	5/29/53	28	70	75	2	−1	2	0	0	3.45	0
22 B	F 20	9/24/52	28	63	71	0	−1	10	3	10	3.98	6
A	21	5/21/53	28	62	69	0	−1	5	4	6	3.30	11
23 B	F 14	12/22/52	28	74	66	5	0	8	10	7	3.59	14
A	15	10/30/53	28	79	68	5	−1	12	12	12	4.38	23
24 B	F 14	1/11/52	28	64	49	8	−1	13	2	6	2.60	12
A	15	5/29/53	28	66	52	8	−1	15	2	4	2.60	12
25 B	F 35	9/24/52	28	64	86	2	−1	7	1	7	4.10	16
A	36	5/29/53	28	66	88	2	−1	8	5	12	4.35	14
26 B	F 14	9/30/52	28	58	51	9	−1	5	0	0	2.85	2
A	15	6/12/53	28	57	43	13	−1	0	0	0	3.82	0
27 B	F 31	10/14/52	27	58	68	0	−1	12	0	14	4.70	19
A	32	6/12/53	27	58	70	0	−1	15	2	9	4.48	31
28 B	F 39	2/29/52	21	51	59	1	−1	17	20	15	4.70	19
A	40	6/ 5/53	21	52	59	0	−1	20	17	12	5.69	30

*B—before treatment, A—after treatment.
†See legend to Figure 2.

Table 3 • Results of treatment with temporary fixed splints (group 5)

Patient*	Sex and age	Date	Roentgenographic examination†					Clinical examination†					
			No. of teeth present	Periodontal space	Alveolar crest		% of complete bone loss	Stippling	Gingivitis	Suppuration (finger pressure)	Interdental papillae	Mean of pocket depths of all surfaces, mm.	No. of months splints worn
					Contour	Lamina dura							
29 B	F 21	3/10/50	30	68	72	8	11.5	−1	9	4	4	3.46	
A	22	6/15/51	30	65	58	10	10	−1	0	0	3	2.73	8
15 B	F 31	2/12/54	28	70	72	3	19.5	−1	5	11	9	4.00	
A	31	8/13/54	28	66	63	4	19	−1	22	6	10	4.64	6
23 B	F 16	4/ 9/54	28	80	77	4	10.5	−1	14	13	11	3.79	
A	16	9/24/54	28	77	65	8	10	−1	18	12	15	4.21	5
25 B	F 36	12/16/53	28	65	91	2	22	−1	22	9	8	4.45	
A	37	8/13/54	28	64	80	2	19.5	−1	20	8	20	4.80	8
30 B	F 17	3/ 7/52	28	81	80	0	26.5	−1	34	26	30	6.12	
A	18	8/28/53	28	72	53	7	25.5	−1	12	4	18	3.48	12
31 B	F 38	1/ 5/54	24	57	51	4	18	U 0 L −1	8	5	13	3.31	
A	38	10/ 1/54	24	53	44	7	19	U 0 L −1	18	10	12	3.56	9

*B—before treatment, A—after treatment.
†See legend to Figure 2.

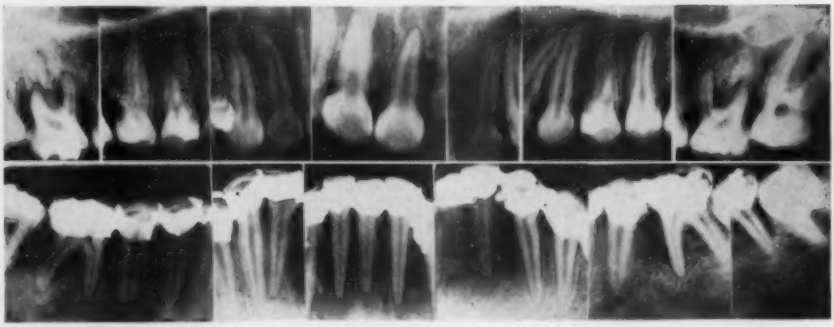


Fig. 4 • First and second rows: Five months after splinting in patient no. 23 (at age 16½), progress of disease arrested in mandible and beginning of new lamina dura distal to right first molar and mesial to left first molar. Below: Splint in place

of local dental treatment with and without vitamin-calcium-phosphorus therapy, vitamin - calcium - phosphorus therapy alone, hormone therapy and splinting were evaluated.

A method of evaluating the contour of the alveolar crest, the width of the periodontal space, the presence of lamina dura at the crest and the percentage of complete alveolar bone loss by roentgenographic examination was used. The results of the histological examination of the gingival biopsy specimens indicate a general similarity between the macroscopic and microscopic appearance of the gingiva.

Local dental treatment with or without vitamin-calcium-phosphorus therapy and home care helped reduce the inflammation and edema of the gingiva to some extent, without having any appreciable effect on the contour of the alveolar crest, the width of the periodontal space, and the lamina dura at the crest. Vitamin-calcium-phosphorus or methylandrostenediol therapy alone had no effect on the periodontal tissues.

Stabilization of the teeth by splinting was used subsequently to one or more of the procedures used in the other groups. This was done with an experimental splint consisting of orthodontic bands soldered together from the right second molars to the left second molars. This was found to be effective in establishing conditions favorable for the healing of alveolar bone. The first indication that the periodontal tissue was brought within

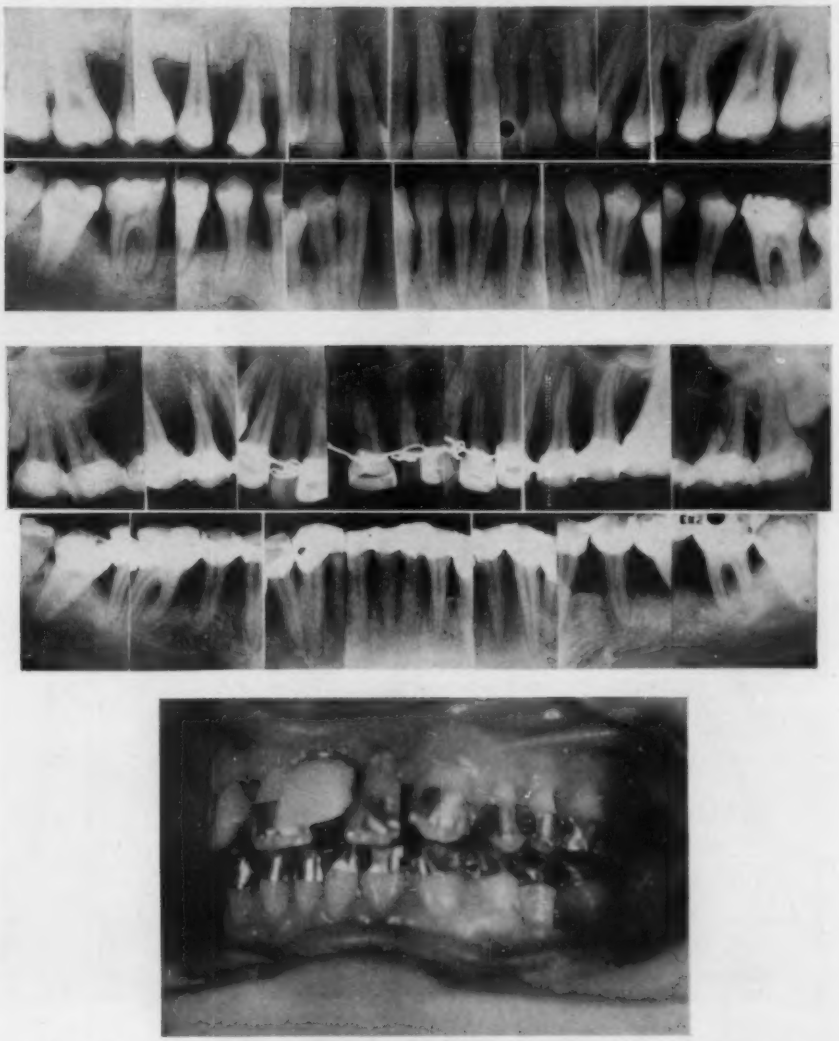


Fig. 5 • First and second rows: Before splints were inserted in patient no. 30 (age 17), interdental bone without crest and becoming ragged and irregular, with regions of thinning and rarefaction, indicating active bone loss. Third and fourth rows: Twelve months after splinting, no irregular crest in interdental bone and rarefied regions filled in. New lamina dura apical to normal position in many regions. Even when degeneration of alveolar bone extended to apex of root, as around maxillary left lateral incisor and first molars, there was repair once teeth were stabilized. Below: Splint used

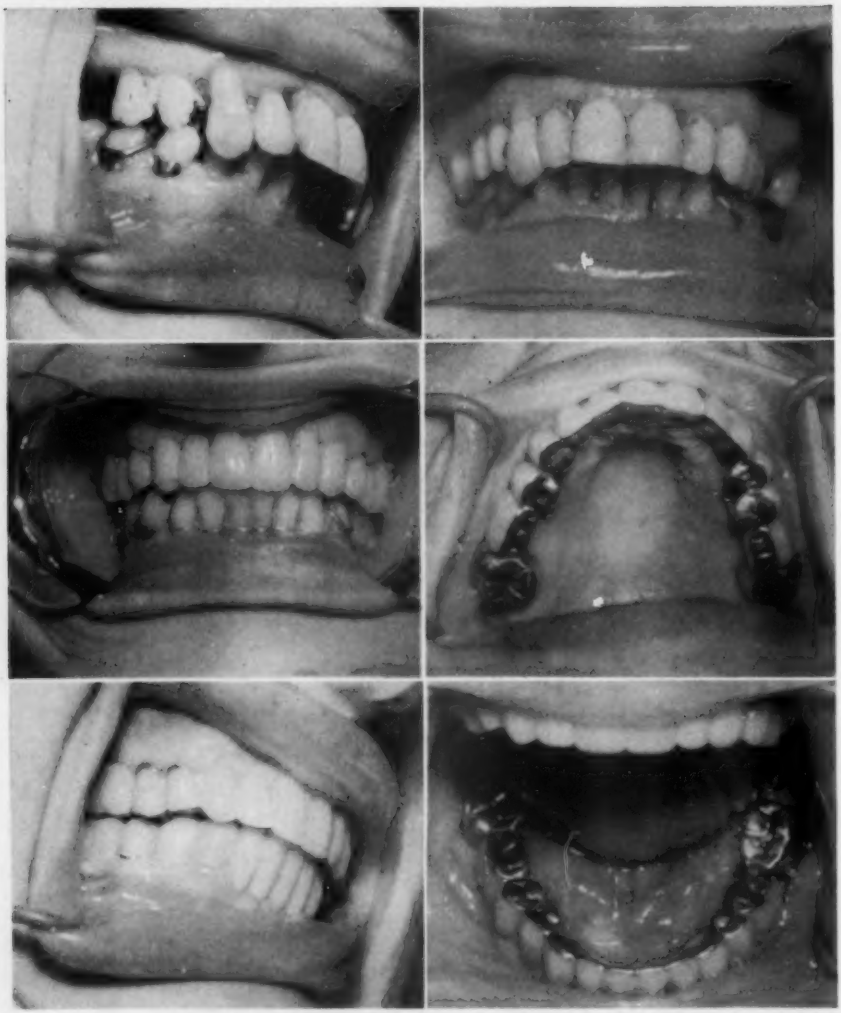


Fig. 6 • Above left and right: Before treatment. Maxillary anterior teeth elongated and protruded, and mandibular incisors also elongated. Recession of gingiva pronounced, especially in maxillary cuspid and mandibular incisor regions. Center left: After completion of maxillary fixed bridge. Anterior teeth set back, correcting overbite and overjet. Mandibular teeth were temporarily ligated. Center right and below right: Fixed bridge in position. Below left: After treatment. Cuspal contours of posterior teeth were modified, and anterior teeth were realigned

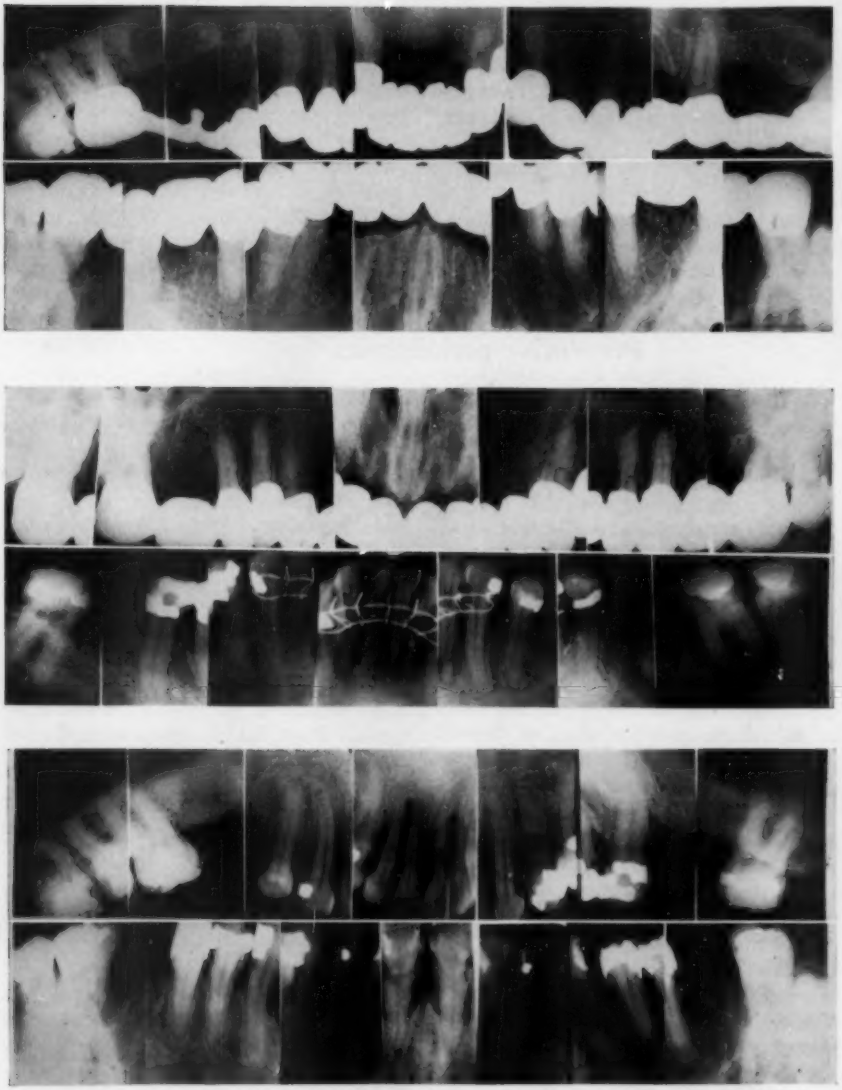


Fig. 7 • Roentgenograms of same patient as in Figure 6. First and second rows: Before treatment. Extensive loss of alveolar bone in incisor regions and thinning of alveolar crest around bicuspids. First molars were missing. Third and fourth rows: One year after completion of maxillary fixed bridge. Rarefied regions are being filled in with alveolar bone in maxilla. Progress of disease has continued in mandible in spite of temporary ligation of anterior teeth, as seen by comparing right lateral incisor and left bicuspid with teeth as shown in first and second rows. Fifth and sixth rows: Two years after completion of bridge. In maxilla, filling in of rarefied regions with alveolar bone is almost complete. Contour of alveolar crest is smooth. In mandible, progress of disease arrested and rarefied regions being filled in

physiologic balance was seen roentgenographically at the alveolar crest. The ragged edges of the crest became smooth, the rarefied regions filled in, and new lamina dura appeared apically to its normal position. Even when the degeneration of the alveolar bone extended to the apex of the root, there was definite repair of the supporting tissues of the teeth once they were stabilized.

Preventive periodontics

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It can be stated categorically that, if all the etiologic factors responsible for periodontal disease could be diagnosed and corrected and then adequate treatment procedures carefully followed, periodontal disease, if not too far advanced, would be prevented or the progress of an already existing pathologic process would be halted. Since the etiology of chronic periodontal diseases is not yet completely understood, the prevention of involvement of the tooth attachment apparatus and the maintenance of oral health are sometimes rather difficult or prove to be ineffective; dystrophic periodontal disease (periodontosis) and an occasional instance of inflammatory periodontitis may develop or progress in spite of dental care. Fortunately, however, enough is understood of the etiologic factors of periodontal disease so that the general practitioner of dentistry today can acquire the knowledge and develop the skill required to prevent the loss of teeth because of periodontal disease in most of the patients who seek his services early and follow his instructions scrupulously.

The most common of the periodontal diseases, chronic gingivitis and periodontitis, can be prevented or kept under control by proper dental treatments if the disease has not progressed too far before therapy is undertaken.

Preventive periodontics includes the carrying out of the following general procedures:

1. Early, accurate diagnosis and thorough treatment of existing periodontal disease. This includes the elimination of local irritations, such as calculus, food impactions and improper restorations, and pathologic pockets, by scaling procedures or gingivectomy.

2. Treatments designed to promote correction or at least delay the progress of periodontal disease. These often include gingivoplasty, occlusal equilibration, alterations in muscle attachment, correction of oral habits and maintenance of good oral hygiene.

3. Measures to promote positive oral and general health, such as orthodontics, the correction of the positions of teeth, restoration of missing teeth, improvement of nutrition and correction of existing systemic disease.

Dean, Indiana University School of Dentistry.

PROCEDURES DESIGNED TO PREVENT PERIODONTAL DISEASE

Preventive dentistry should be considered as comprehensive, since, actually, almost all dental treatments are designed to promote oral health. Prevention of the initiation of periodontal disease and the correction and prevention of extension of already-existing involvements will result if certain procedures are carefully performed. Detailed description of how these procedures should be performed is beyond the scope of this paper. These procedures are as follows:

1. For oral prophylaxis, careful oral and roentgenographic examination to locate all forms of local irritations, such as deposits on teeth, poor dental restorations, food impactions, premature occlusal contacts, abnormal forces on teeth and improper oral habits; careful scaling and polishing of each surface of each tooth and the elimination of all forms of local irritations;[1] and adequate education of the patient regarding home care, and the need for follow-up treatments every four to six months.[2,3]

2. For oral rehabilitation, the completion by the dentist of all treatments necessary to make it possible for the mouth to be maintained in a state of health; such as recontouring of gingival tissues (gingivoplasty), reduction of pathologic pockets (gingivectomy), the placement of bridges to improve function and equalize occlusal forces and selective tooth grinding, performed to correct occlusal contours, mandibular shifts due to premature contacts, abnormal contact areas and improper habits and to balance occlusal forces.

3. For the promoting of positive oral and general health, the informing of the patient that good general health is essential to the maintenance of oral health and that he should seek medical attention if it is apparent that the oral tissues do not heal satisfactorily or if there are any signs suggestive of systemic disease. Obviously, inadequate nutrition and debilitating disease will contribute to oral disease. Excellent nutrition and robust general health will improve the effectiveness of treatments and promote good oral health.

HOME CARE

Paramount in the prevention of periodontal disease is the maintenance of good oral hygiene after the dentist has completed his treatments. By definition, proper dental treatment will leave the oral cavity so that the patient can maintain a state of oral health and will include instruction and motivation of the patient to do so. Prevention of periodontal disease and maintenance of oral health can be accomplished only if patients are willing and able to perform daily the few simple procedures required to cleanse the oral cavity. Most dentists spend too little time in teaching patients how to care for their mouths and even less time in teaching the value of home care.

Ordinarily, healthy gingival tissue can be maintained if any one of many different toothbrushing technics is used correctly. Analysis of various technics recommended by periodontists indicates that the one important factor common to all is the thoroughness with which a brush is used. To get good results, the toothbrush should be used methodically, regularly, carefully and often.

It is generally agreed that the brushing should be done at least twice a day in a manner which will not allow the ends of the bristles to irritate the gingival tissue. The sides of the bristles should be pressed against the soft tissues, with as much lateral pressure as the patient can tolerate, and the brush should be "rolled"

1. Hine, M. K., and Swenson, H. M. Role of prophylactic procedures in the treatment of periodontal disease. J.A.D.A. 45:301 Sept. 1952.

2. Hine, M. K. Use of the toothbrush in treatment of periodontitis. J.A.D.A. 41:158 Aug. 1950.

3. Hine, M. K. Tooth brush. Internat. D. J. 6:15 March 1956.

toward the occlusal or incisal surface. Vibratory technics are helpful in selected instances provided the patient is properly instructed.

Toothbrushing, which of course includes gum brushing, aids in the maintenance of oral cleanliness, which is important in the prevention of periodontitis, and certainly improves the comfort and appearance of the oral cavity. Specifically, toothbrushing should thoroughly remove from teeth all food debris, stains, accumulations of microorganisms and recently deposited uncalcified supragingival calculus; should dislodge collections of food debris and accumulations of microorganisms from the interproximal spaces below the contact areas and between the teeth; should massage gingival tissues gently to promote good blood circulation and adequate keratinization of the epithelium and should not irritate or lacerate gingival tissues. The pink toothbrush indicates the presence of gingival inflammation or improper brushing.

If the toothbrushing procedure employed by a patient does not meet these aims, another technic should be recommended, a different brush or a different technic should be tried, or perhaps a longer brushing time should be used.[4]

Type of Brush • No one style of toothbrush has proved to be ideal for all types of patients, so it is desirable to select the brush only after carefully considering the patient's needs. For example, individuals with inflamed gingival tissues should use brushes with finer bristles, people with narrow dental arches or edentulous spaces often need special types of brushes and children need toothbrushes with smaller heads than do adults. In general, however, most individuals can use a brush described as follows:

Handle • The handle of the brush should be approximately 6 inches in length, straight and of a fairly inflexible material that is impervious to fluids.

Head • The head of the brush should be approximately ⅜ inch in width and 1¼ inches long, and should have a rounded end.

Bristles • The bristles should be arranged in two or three rows of six to eight tufts each and should be confined to an area approximately 1¼ inches in length and ⅜ inch in width. The bristles or nylon filaments should be approximately ½ inch long, in tufts which are tapered. The tufts should be trimmed to a straight line. The bristles should be of medium texture unless the patient's gingival tissues are easily traumatized. For such patients a soft texture brush should be recommended for use until the condition of the gingival tissues returns to normal.

A brush made of natural bristles which are of medium texture is recommended. Since the stiffness, commonly referred to as the hardness, of natural bristles varies, only brushes with the texture stamped on the handle should be recommended. In a study made a few years ago, it was found that the stiffness of brushes varied widely; dentists who wish to have their patients use a certain texture of toothbrush should recommend those brushes which are manufactured with care.[5] Brushes should be discarded as soon as their bristles begin to fray or break.

The type of brush described can be manipulated well by most patients and will prove to be a satisfactory instrument for removing debris from around teeth, cleansing interproximal spaces and cleansing and furnishing friction to gingival tissues.

There is little scientific evidence to prove that natural bristles are superior to nylon filaments, but, apparently, the natural bristles cleanse better even though they soften when placed in water.[6] It is

4. Hine, M. K. Principles of treatment of periodontal disease. Oral Surg., Oral Med. & Oral Path. 9:604 June 1956.

5. Hine, M. K., Jr. Variation in toothbrush textures. J.A.D.A. 46:536 May 1953.

true that nylon filaments will last longer, are more easily cleansed, are standardized more readily and will not soften in water, but natural bristles seem to possess bristles cleaned better than nylon fila- qualities which make them preferable. Recently, Krusic reported that natural ments and that nylon was corrosive to enamel. Unfortunately, apparently only one nylon brush was used, the diameter of the filament was not stated, lighting of photographs was not controlled and the control and experimental areas that were photographed were not identical.[7]

The type of brush used is not as important as the technic used for brushing the teeth and gums. The technic must be precise and thorough and must be selected to suit the patient's individual needs.[8]

Careful use of a round, hardwood toothpick often will be of value in assisting the toothbrush in dislodging accumulated debris from the interproximal spaces and, at the same time, will massage and recontour the gingival tissues. Correct use of dental floss and dental tape is occasionally indicated to improve cleansing of the interproximal surfaces and spaces. The use of a mild mouth rinse or even just tap water will aid in oral cleanliness because of the mechanical action. No antiseptic mouth rinse need be recommended routinely.

No dentifrices available today are of proved therapeutic value in the treatment of periodontal disease. One of the several widely sold dentifrices which contain an effective polishing agent and are of palatable flavor can be recommended to aid in the mechanical cleansing of the teeth and to make brushing more pleasant.

Emphasis should be placed by the dentist on the value of home care in the maintenance of good oral hygiene. Unless the patient is motivated to maintain good oral hygiene carefully, tediously and persistently, the dentist's treatment of periodontitis, no matter how complex, will result in temporary improvement only.

NUTRITION

The relationship of good nutrition to general health is well established, and it can be inferred that a similar relationship exists between good nutrition and health of the periodontal tissues. Unfortunately, studies with clear cut clinical data on humans are difficult to find; truly scientific reports of instances of periodontal disease due to nutritional deficiencies in humans are uncommon.

It has been the practice of many dentists and physicians to treat periodontal disorders by the administration of mineral supplements, certain members of the B complex group of vitamins or ascorbic acid, with little or no concern as to whether or not there is a nutritional inadequacy. In 1946, the Royal Canadian Air Force reported a study of the relation of ascorbic-acid intake to gingival diseases in healthy young men whose diets were carefully controlled; findings indicated that inflammation of the gingiva was commonly found among the apparently healthy young adults who were examined and that the administration of large amounts of vitamins A, D, thiamine, riboflavin, nicotinic acid and ascorbic acid for a period of five months had no clinical effect on preexisting inflammation of the gingiva.[9]

It is often possible to treat periodontal disease entirely adequately by local procedures alone. It is little wonder, then, that the relationship of nutrition to periodontal disorders has been neglected by many. The importance of adequate nutrition in maintaining the conditions of normal gingiva and supporting tissues, however, should not be minimized.

6. Hine, M. K., Jr., Wachtl, C., and Fosdick, L. S. Some observations on cleansing effect of nylon and bristle tooth brushes. J. Periodont. 25:183 July 1954.

7. Krusic, V. Investigation of toothbrushes and tooth pastes used in Yugoslavia. (Abst.) D. Abst. 1:579 Oct. 1956.

8. Coolidge, E. D., and Hine, M. K. Periodontia: clinical pathology and treatment of the periodontal tissues. Philadelphia, Lea & Febiger, 1954, p. 367.

9. Linghorne, W. J., and others. Relation of ascorbic acid intake to gingivitis. J. Canad. D.A. 12:49 Feb. 1946.

Many nutrients have been said to be involved in the development of periodontal diseases. Animal experiments have shown that protein deficiency may produce periodontal diseases involving both the gingiva and supporting tissues. Today most investigators believe that protein deprivation results in an increased incidence of periodontal diseases due to reduced resistance to infection and impaired healing.[10-12]

The role of dietary fat in preventing periodontal diseases deserves much more consideration than it has received in the past. A recent study by Kramár and Levine[13] postulates a relationship between capillary resistance and dietary fat. Fats also are related to the normal metabolism of certain essential minerals and, as such, should be considered further in the etiology of periodontal disease. Periodontal disturbances have been readily produced in laboratory animals by diets too low in or with an improper balance of calcium and phosphorus or by diets lacking in vitamin D. Similar effects in human subjects have been indicated by a study which showed a statistically significant, inverse correlation between food calcium intake and the degree of periodontal disease, that is, the lower the food calcium intake, the greater the degree of periodontal disease.[14,15]

Furthermore, data on calcium intake have been found useful in the prediction of periodontal disorders. Inclusion of factors other than calcium intake, such as the intake of protein, iron or vitamins A or C, acid-base excess or age, resulted in predictions no more accurate than those with the use of calcium intake alone.[15] Karshan[16] and co-workers[17] have reported on studies of the blood of patients with periodontosis, periodontitis complex and advanced periodontitis simplex and have showed that values deviating from normal ranges were present in a greater percentage of patients in each of these groups than in a control group of patients who were free from periodontal disease. This was true for values of vitamin C, glucose, globulin, albumin, calcium, alkaline phosphatase and other blood factors. The fact that more values deviating from normal ranges were found in the groups with periodontal disease than in the control group suggests that one or more systemic conditions are associated with these diseases in many of the patients with these conditions who were studied. It is interesting to note that examination of the records on food intake in both groups indicated that a large percentage of the individuals fell below the standard dietary intakes recommended by the food and nutrition board of the National Research Council for calories, protein, calcium, phosphorus, iron, thiamine, riboflavin and niacin. Furthermore, the studies indicated that the plasma vitamin C level was low in a large percentage of the patients with periodontosis in spite of an adequate intake of this vitamin.[16,17] This may mean that there was some interference with the utilization of this vitamin.

A variety of vitamin deficiencies have been associated with gingival diseases. The study of Linghorne and others,[9] which involved no correlation between ascorbic acid intake and periodontal disease, points out the fact that a cautious perspective must be maintained in stating that periodontal disease is a result of a single missing vitamin, but it is the

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12. Harvey, S. C., and Howes, E. L. Effect of high protein diet on velocity of growth of fibroblasts in wound healing. Ann. Surg. 91:641 May 1930.

13. Kramár, J., and Levine, V. E. Influence of fats and fatty acids on capillaries. J. Nutrition 50:149 June 1953.

14. Tishler, B. Diet analysis of 101 periodontoclasia cases. J.A.D.A. 16:1037 June 1929.

15. Radusch, D. F. Relationship between periodontal conditions and certain dietary factors. J. D. Res. 18:305 Aug. 1939.

16. Karshan, M. Systemic factors in periodontal disease. J.A.D.A. 44:656 June 1952.

17. Karshan, M., and others. Studies in periodontal disease. J. D. Res. 31:11 Feb. 1952.

opinion of most nutritionists that gingivitis may result from dietary deficiencies involving more than one member of the B-complex group. Niacin, riboflavin, pyridoxine, thiamine, vitamin C, pantothenic acid, folic acid and others are frequently considered related to contributing factors, but their exact role is not clearly defined. In fact, Afonsky[18,19] has stated that the response of the tissue to irritation can be modified by a deficiency, but the lesions are not specific in themselves and are due in most instances to the presence of local irritation. It has been reported, however, in clinical studies on humans that there are fewer recurrences of acute necrotizing gingivitis if supplements of vitamin B complex are provided.[20]

In reviewing the relationship of nutrition to periodontal disease, Muhler[21] concluded that, although data from direct study of humans are limited, it is obvious that the periodontal tissues require a regular supply of dietary essentials balanced at a satisfactory level. Most of the people in the United States eat more than enough food to satisfy hunger, but they do not appreciate fully that foods used to satisfy the appetite are often low in essential nutrients. After a dietary survey has been made, a regimen designed to prevent periodontal diseases including substances for the correction of nutritional deficiencies should be instituted.

OTHER FACTORS

There are many other factors which contribute to the severity of periodontal disease or, if the effect of the factor is within physiologic limits, to the maintenance of oral health. Stress-producing agents, the endocrine system, neuropsychiatric factors, food allergies and other factors and their influence gradually are being better understood. The correction of deviations from normal is essential for the prevention and for the treatment of diseases, including those of the periodontium. Much study and research is needed before the complete story of the etiology of periodontal disease can be written and before a completely effective program for the prevention of periodontal diseases can be devised.

SUMMARY

Until the etiology of periodontal disease is completely understood, preventive periodontics will not be universally effective. The prevention of most of the damage resulting from periodontal disease is now possible, however, if the dentist will utilize known therapeutic measures capable of preventing the initiation of periodontal disease, correcting existing periodontal disease, and preventing the extension or recurrence of the disease in the patient.

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19. Afonsky, D. Oral lesions in niacin, riboflavin, pyridoxine, folic acid, and pantothenic acid deficiencies in adult dogs: II. Gingival and periodontal lesions. Oral Surg., Oral Med. & Oral Path. 8:867 Aug. 1955.

20. King, J. D. Vincent's disease treated with nicotinic acid. Lancet 2:32 July 13, 1940.

21. Muhler, J. C. Personal communication.

Words • We want words to do more than they can. We try to do with them what often comes to very much like trying to mend a watch with a pick or to paint a miniature with a mop. We expect that words will help us to grip and dissect that which in an ultimate essence is as ungrippable as a shadow. *Samuel Butler. Notebooks.*

Periodontal considerations in restorative dentistry

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In creating adequately functioning and physiologically compatible dental restorations to maintain and encourage oral health, the primary tenet must be that retention of the teeth is dependent on the maintenance of the alveolar structures. All restorative procedures must be done with this in mind.

Any discussion of periodontal considerations in restorative dentistry must include mention of cautions in regard to operative technics[1]—care should be taken in instrumentation with stones, disks and burs so as to reduce trauma to soft tissue and alveolar bone; in the use of separators and wedges and the application of copper bands; in the use of drugs, surgery or cautery for sterilization or for the reduction of excessive tissue; and in the application of surgical packs, crown forms and temporary splints with a minimal amount of direct pressure and occlusal stress.

FUNCTIONAL CONSIDERATIONS

In all restorative dentistry the patient's age and the periodontal resistance should be considered in relation to the cusp inclination.[2] The degree of intercuspation should be correlated with that achieved by occlusal equilibration. Proper tooth contour and position should afford gingival protection. Occlusal anatomy must be adequate to permit efficient chewing. The proper placement and size of contact points and marginal ridges should prevent food impaction.[3] Contact points, in addition, aid the teeth in supporting each other. The equilibrated occlusion should be maintained by contact in excursive movements as well as in the centric position.

PROSTHESIS

Fixed Partial Prosthesis • Fixed partial prosthesis, when possible, is usually considered to be the most desirable restoration for maintaining alveolar structures.[4] This type of prosthesis will be most effective if consideration is given to the buccolingual width of the occlusal table of the bridge in relation to five factors:

1. The length of the span. The longer the span, the narrower the width of the occlusal surfaces.

2. The length, shape and number of the roots of the teeth involved. Any of these which supply mechanical support

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3. Sorrin, S. Interrelation of periodontal treatment to restorative dentistry. New York Univ. J. Den. 10:99 Jan. 1952.

4. Obin, J. N. Periodontal principles of restorative dentistry. New York D. J. 22:57 Feb. 1956.

permit greater latitude in determining the occlusal width. With less support, minimal width is required. The original occlusal area of the abutments should be carefully considered in relation to the total restored biting area.

3. The location of abutments. The resistance to stress of an abutment in a given direction is proportional to the distance between abutments. Abutments located around the curve of the arch have greater resistance than those which are in a straight line.[5]

4. The amount and distribution of the supporting bone. Obviously teeth with greater amounts of supporting bone would be more desirable as abutments. Bone distribution, however, is a factor. Given two teeth with the same type and amount of bone, the tooth with alveolar heights that are unequal may be more effective as an abutment than the one with alveolar heights that are not unequal.

5. The masticating force in relation to the facial musculature. Individuals with strongly developed muscles of mastication can apply more pressure to the periodontal support than can those with less well developed muscles. The relationship between muscle action and the type of alveolar support must be considered. In a patient with powerful muscular force and weakened periodontal support, narrower occlusal tables should be used.

Multiple Abutments • Multiple abutments should be used in long spans and in instances in which adjacent teeth have short or conical roots or in which teeth are involved periodontally. Splinting technics were developed because of recognition of the fact that an increase in the number of roots supporting a restoration obviously should give greater support. The additional benefits, however, are even greater. Increasing the number of roots will alter the fulcrum on which a restoration may tend to move, thus increasing the amount of alveolar support.[6] A note of caution—areas opposing multiple abutments, either fixed bridges or splints, should be carefully and routinely evaluated. Alveolar collapse around individual teeth opposing large fixed segments has been a common finding.

In constructing a fixed partial prosthesis, proper alignment should be considered. Interproximal embrasures should be enlarged to encourage cleanliness and not interfere with circulation. Soldered joints should be sufficiently strong to prevent bending of the bridge, which causes abutment movement. The soldered joints, however, should not interfere with the gingival circulation. Pontic saddles should not compress the gingiva.

Removable Bridges • Some of these factors should be considered in the fabrication of removable bridges. There are the following additional considerations[7,8]:

1. Lug rests should be placed at right angles to the long axis of the teeth. Use of attachments of modified crowns and inlays will help achieve this result.

2. Proper surveying will promote equitable distribution of stress.

3. The use of strong, rigid lingual and palatal bars will maintain proper relationships between the component parts of a partial denture. Acrylic horseshoe partial dentures are not considered desirable. Their design usually results in a tissue-borne appliance. The development of interproximal fingers, frequently associated with the use of prostheses of this design, causes irritation, with eventual inflammation, pocket development and tooth loss.

Naturally, certain prosthetic problems involve the use of a combination of fixed

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8. Trapozzano, V. R., and Winter, G. R. Periodontal aspects of partial denture design. J. Pros. Den. 2:101 Jan. 1952.

and removable partial dentures. The stabilization of the abutments affords maximum effectiveness, and right-angle placement of the removable appliance's connectors can be achieved within the crowns.

COMMENT

The principles of effective restorative procedures are appraisal of the periodontal capacity, careful operative technics and the application of technics which maintain the alveolar structures.

Conflict often arises between the circulatory demands of tissue and the operative requirements, but, primarily, gingival health, which is closely related to gingival circulation, is the responsibility of the patient. The patient must be shown effective methods of home care and made aware of the limitations of treatment.

When one considers the imposing list of hazards that can be encountered, it is indeed a tribute to the dental profession that effective restorative procedures have been developed, but, as a warning to all dentists, treatment should not be planned on the basis of a haphazard diagnosis. The most desirable instruments for chewing are the natural teeth. They should be retained by the use of the ever-increasing skill in the field of prevention.

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Surgical repositioning of vestibule and frenums in periodontal disease

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The vestibular fornix is defined as the horseshoe-shaped furrow where the mucous membrane of the lips and cheeks is reflected onto the upper and lower alveolar processes.[1] This has often been referred to as the mucobuccal fold.[2] The mucous membrane in this area is supported by loose, vascular connective tissue, which fuses with the firm, pink alveolar gingiva at the mucogingival line.[3] Normally the alveolar or attached gingiva forms a band several millimeters wide from the mucogingival junction to the free margin of the gingiva. Connective tissue strands or frenums interrupt this contour at intervals (Fig. 1,A). Figure 2 is a sagittal section through the incisor area of a human mandible, which clearly outlines the normal anatomy of these parts. A general outline of the site of origin of the facial muscles is shown on the skull in Figure 3.[4]

Recession of the gingiva below the attachment of the vestibular mucosa, regardless of cause, will create a problem in

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Sketches were prepared by Virginia Brooks; photographs by Cliff Freehe.

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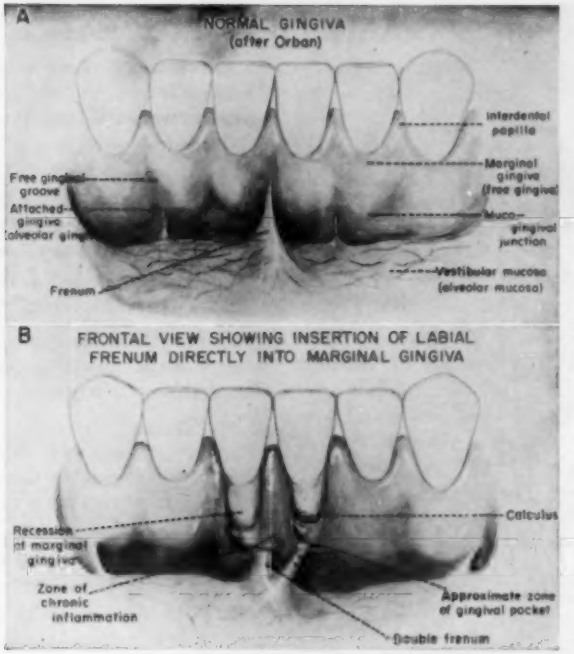

Figure 1

Fig. 2 • Sagittal section through incisor region of human mandible showing relationship of structures in normal vestibule

Fig. 3 • Human skull showing zones of origin of facial muscles that may be involved in problems concerning vestibule or frenum

Fig. 4 • Plaster model for splint

management (Fig. 1,B). Oral hygiene is impaired, and the pressure of brushing may cause further recession in this critical region.[5] Associated food debris and bacterial irritants create a zone of chronic inflammation with the usual picture of edema and round cell infiltration. A deep trough usually results between the labial surface of the tooth and the adjacent vestibular mucosa. Every movement of the lip or cheek creates a tensional pull on the fibers inserting into the pocket wall. To relieve this tension, the fibers must be severed completely to a more apical level. This will permit regeneration of the attached gingiva, which will be closely adapted to the underlying bone and root structures. Massage and function will soon establish a firm, keratinized surface.

The following is an outline of procedures for the correction of the abnormality. Similar and modified procedures pertaining to the periodontium have been reported by other workers.[6-9] Further applications of these technics have been described as aids to preparation of the edentulous ridge prior to receiving prosthetic appliances.[10-13]

PROCEDURE

1. Preliminary prophylaxis is carried out to remove gross irritants and reduce inflammation. The occlusion is adjusted.

2. A plaster cast of the area to be operated on is prepared. A separating medium is applied. Successive layers of self-curing acrylic resin are built up with liberal extension of the borders (Fig. 4). The cast is removed when hardened, the excess is trimmed and the outer surface is polished.

3. Preoperative sedation is given, and 300,000 units of penicillin is administered intramuscularly one hour before the operation. Infiltration anesthesia of the operative site with sufficient vasoconstrictor to aid hemostasis is advisable.

4. The splint is checked for fit, and holes for the ligature wire are placed. The occlusion is adjusted with this splint in place.

5. Any periodontal pockets are reduced surgically to the desired level. Any necessary root planing is finished.

6. The extent of vestibular reduction is determined. An incision is made at right angles to the underlying bone, following the mucogingival junction. The incision is extended at least two teeth to each side of the area in question if possible. The connective tissue and muscular attachments are released from the periosteum by blunt dissection. They are separated sufficiently deep to displace the vestibule 1 to 2 cm. lower.

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7. Hemostasis is effected. Ligature wire (dead, soft, .010 inch) is carried through the interproximal space from the lingual side, encircling the teeth which act as retainers. The cement-filled splint is brought to place, and the wire is threaded through the prepared holes. The splint is pressed firmly into place, the wires are tightened and excess cement is rolled over the margins of the splint.

8. The following is prescribed:

a. Penicillin (300,000 units by mouth, three times a day, for four days).

b. Systemic sedatives to control pain.

c. A small tube of anesthetic dental ointment for local application to the operative site.

Oral hygiene instructions and dietary advice are given to the patient. Postoperative recall in three to seven days is arranged.

9. At the return visit, the splint is removed and cleaned. The surgical wound is cleaned and dèbrided. A 20 per cent solution of trichloroacetic acid is applied to any exuberant tabs of granulation tissue. The splint is replaced as previously outlined. A return appointment is arranged for seven days later.

10. At the next visit, the splint is removed, and the teeth are polished thoroughly. Oral hygiene procedures are reviewed, and the patient is instructed in gentle finger massage of the operative region. This will minimize fibrous adhesion and hasten softening of the submucosa. The occlusion is checked again.

11. After further healing of the operative site, the case is re-evaluated. Temporary splinting for stabilization of the teeth can be performed before or after these procedures. A continuous labiolingual arch wire secured by interproximal loops is easily applied and serves effectively. Permanent splinting should not be performed routinely until a satisfactory long-term prognosis is evaluated.

Modification of these procedures must be considered depending on the site of the operation and the deformity present. Proper contouring of the gingival pockets should precede the vestibular reduction part of the operation. This is accomplished nicely by the use of the electrosurgical scalpel; however, any accepted method of pocket reduction will suffice.

Figure 5,A, depicts the normal relation of structures. Figures 5,B-D, illustrates the pathologic condition, the surgical splint in position and the results of treatment. The case reports further illustrate modifications that may be necessary in different regions of the oral cavity.

REPORTS OF CASE

Case 1 • A 55 year old woman had chronic periodontitis involving the lower incisor teeth. Recession of the labial gingiva had occurred on the central incisors to a point below the attachment of the labial frenum (Fig. 6,A). The teeth were slightly mobile with moderate pockets and mild exudate. The gingival margin could be freely displaced from the root by lip movement. The patient's home care was considered generally satisfactory, yet this region was a chronic source of irritation and inflammation because of the food impaction and persistent calculus deposition.

The gingival pockets were reduced to the proper level with a fine electrosurgical point (Fig. 6,B). This was followed by thorough planing of the root surfaces. An incision was made from the lower left first bicuspid to the lower right first bicuspid, following the mucogingival line. It was directed down and inward to the labial plate of bone. Blunt dissection was used to free muscle and connective tissue fibers to the desired depth (Fig. 6,C). After control of hemorrhage, the prepared acrylic splint was overfilled with the puttylike surgical dressing material and adapted into position. The cement is squeezed into the interproximal spaces,

and the excess is rolled over the margins of the splint by lip manipulation. The splint was then ligated to the lateral incisors (Fig. 6,D).

Postoperative instructions were given, and the patient was dismissed. One week later the splint was removed and cleaned, and the operative site was irrigated and checked for exuberant granulation tissue. A new dressing was applied and allowed to remain for another week. On the patient's return, the splint was removed and the teeth thoroughly polished. Minor occlusal adjustments were made, and home care procedures were outlined in detail.

Figure 6,E, illustrates the operative site after two months. There was a new zone of pink, firm, keratinized, attached labial

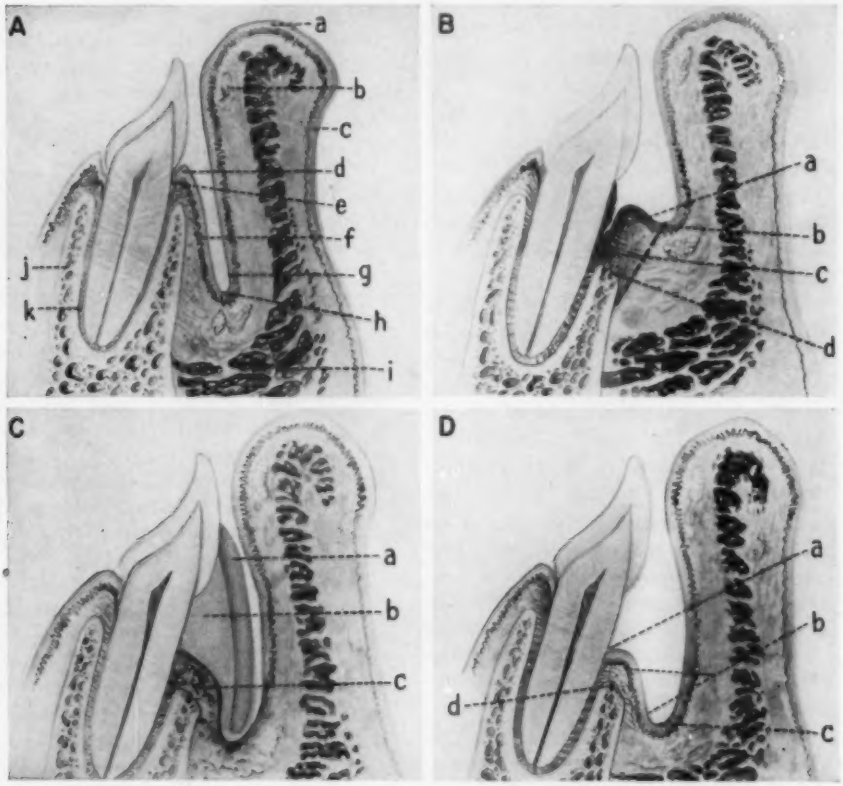

Fig. 5 • A: Sagittal section through lower incisor area showing normal relationship of structures. a, vermilion border of lip; b, labial gland; c, epidermis of outer lip; d, free gingiva; e, epithelial attachment; f, keratinized attached gingiva; g, nonkeratinized oral mucous membrane; h, floor of vestibule; i, orbicularis oris muscle fibers; j, alveolar bone, and k, periodontal membrane. B: View before surgery. a, base of pocket below vestibular fornix; b, line of incision; c, chronic inflammatory infiltration of lymphocytes and plasma cells, and d, active bone resorption. C: Acrylic splint in position. a, acrylic splint; b, cement dressing and c, organizing blood clot. D: Result of therapy. a, shallow gingival sulcus; b, new zone of attached gingiva; c, floor of vestibule below epithelial attachment, and d, active bone repair with reappearance of lamina dura

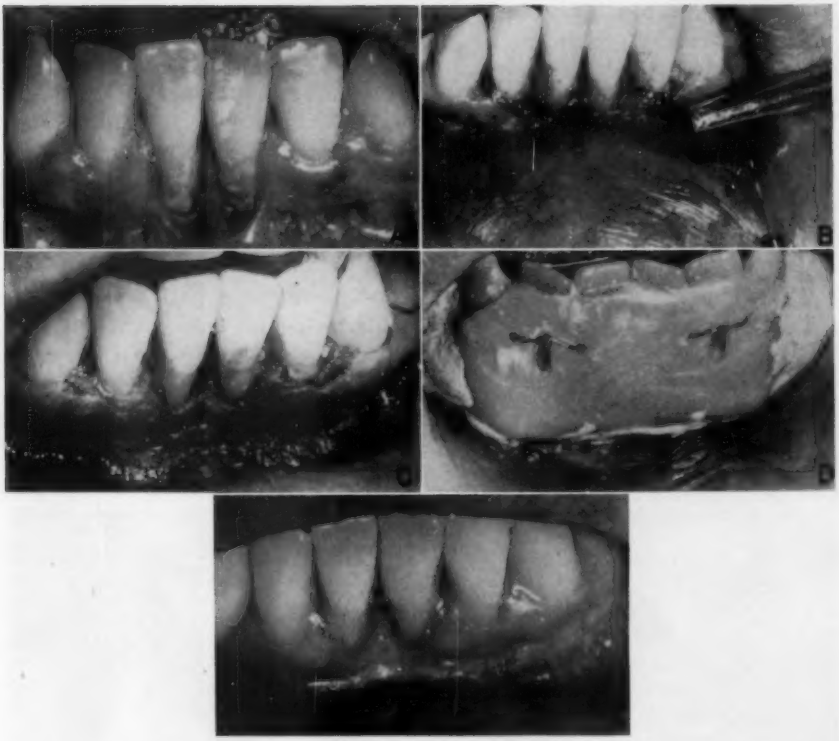

Fig. 6 • Case 1. A: Preoperative view. Note insertion of labial frenum directly into interproximal papilla, gingival recession and retention of calculus and food debris. B: Gingivoplasty completed using fine electrosurgical point. Root planing finished. C: Vestibular reduction completed to desired depth. Connective tissue and muscle attachments separated from periosteum by blunt dissection. Hemostasis effected. D: Overextended acrylic splint with cement dressing ligated into position. E: Two months postoperative. Note vestibular insertion at lower level on alveolar bone. Attached gingiva firm, pink and well keratinized. Gingival sulcus shallow and self-cleansing

gingiva. Oral hygiene was being maintained adequately. Six months later the region continued to appear in good health. Less mobility of the central incisors was noted.

Case 2 • A 45 year old woman had a 7 mm. pocket on the mesial aspect of the upper right central incisor. A dense fibrous frenum inserted into the overlying pocket wall (Fig. 7,A). Probing revealed extensive subgingival calculus. A purulent exudate could be expressed from the region; however, inflammation was not severe. The teeth were not mobile.

It was felt that the primary cause of the periodontal pathosis was local irritation resulting from the subgingival calculus, rather than from the frenum itself. As the pocket deepened, however, the tensional pull of this bulky frenum certainly was adding insult to the injury. Reattachment procedures were indicated.

The frenum was excised to the desired level (Fig. 7,B) and sutured. The labial tissues were then retracted, chronic

granulation tissue was removed and the root was planed smooth (Fig. 7,C). A fresh blood clot was established, and the flap was replaced into position and sutured (Fig. 7,D). A tin-foil protective dressing was prepared by application of tincture of benzoin and denture adhesive powder to the foil before adapting it over the operative site. The foil was extended from the palatal tissue over the teeth and trimmed free of lip movements (Fig. 7,E).

The patient was advised to be extra cautious during eating and was dismissed for three days.

On the patient's return, the foil was removed, and the region was irrigated gently. The sutures were left in place. The patient was advised to rinse the mouth gently in order to prevent disturbance of the blood clot. One week later the sutures were removed, and the usual home care procedures were outlined.

At the two month recall, a moderate shrinkage of the gingiva was noted (Fig. 7,F). Considerable force was applied with a blunt Williams periodontal probe to determine the nature of the pocket. It could be inserted only 2 mm. Allowing 2 mm. for shrinkage it was obvious that a reattachment of some degree had been obtained. Whether this was an actual connective tissue union with newly de-

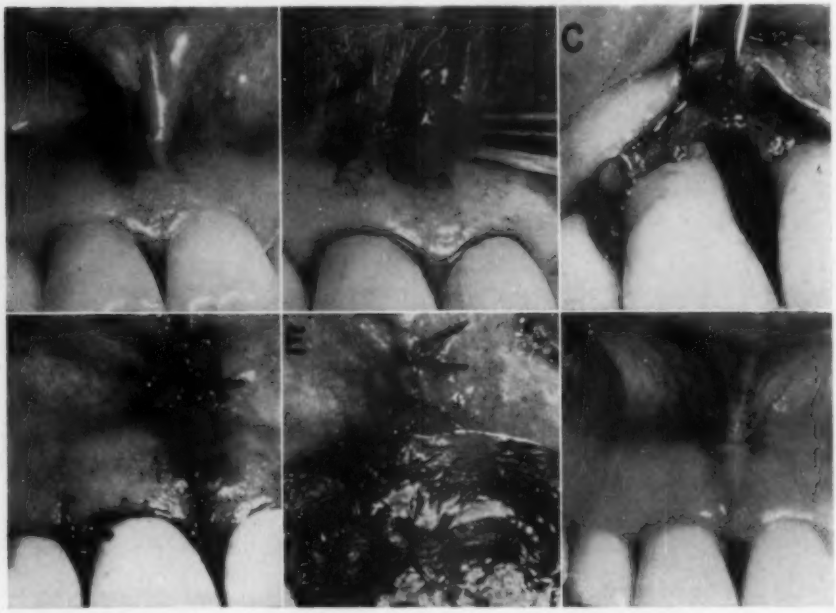

Fig. 7 • Case 2. A: Preoperative view. Note thick fibrous frenum insertion well onto attached gingiva between central incisors. Stretching of this band of tissue caused displacement of gingiva on mesial side of right central incisor. B: View after frenotomy was completed; region ready for sutures. C: Labial flap retraction; chronic granulation tissue removed; root planing completed. Note intrabony pocket contour. D: Labial flap repositioned and sutured. Fresh blood clot established. E: Protective tin foil adapted over teeth and tissue. This helps protect blood clot during initial stages of repair. F: Two months postoperative. Interproximal attached gingiva no longer disturbed by labial frenum. Gingival sulcus is shallow

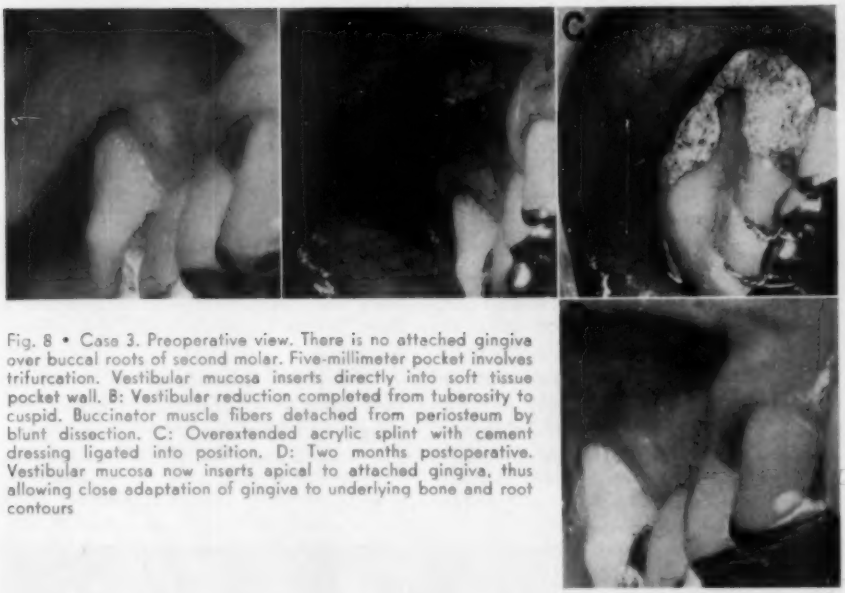

Fig. 8 • Case 3. Preoperative view. There is no attached gingiva over buccal roots of second molar. Five-millimeter pocket involves trifurcation. Vestibular mucosa inserts directly into soft tissue pocket wall. B: Vestibular reduction completed from tuberosity to cuspid. Buccinator muscle fibers detached from periosteum by blunt dissection. C: Overextended acrylic splint with cement dressing ligated into position. D: Two months postoperative. Vestibular mucosa now inserts apical to attached gingiva, thus allowing close adaptation of gingiva to underlying bone and root contours

posited vital cementum or a tight epithelial adaptation to the root could only be determined by histological studies. Regardless of the exact nature of the attachment, the clinical evidence of health was satisfactory.

Case 3 • A 40 year old man had chronic periodontitis involving the upper right second molar. A pocket of 5 mm. extended into the buccal trifurcation region. The vestibular mucosa inserted directly into the soft tissue pocket wall (Fig. 8,A). The third molar was hopelessly involved with periodontal destruction and had to be considered for extraction. The involved second molar was the posterior abutment for a fixed bridge extending forward to the cuspid. This had been in place two years. Loss of this tooth would require a removable type appliance in the upper jaw.

After a thorough appraisal of the alternatives, it was decided to attempt an extension of the vestibular fornix. The following factors were considered favorable to the long-term prognosis: (1) adequate root length; (2) satisfactory tissue resistance and dense bone; (3) no involvement of the palatal root; (4) splinting effect of the bridge in place; (5) loose, pliable cheek mucosa, and (6) favorable cooperation of the patient.

An incision was made from the distal tuberosity region forward to the cuspid. Muscle and connective tissue fibers were detached rather deep by blunt dissection (Fig. 8,B). Subgingival curettage was performed to smooth the roots and prepare the gingival pocket tissues for reattachment. After control of hemorrhage, the splint and dressing were applied and ligated into position (Fig. 8,C). In this instance, the splint was kept in position for three weeks, with periodic changes of dressing, to insure adequate displacement of the buccinator muscle during repair. The teeth were then polished thoroughly, and the patient was dismissed with instructions for home care.

Two months later a gingival recession of 2 mm. was noted. The buccal trifurcation was self cleansing, and the attached gingiva was well adapted over the underlying bone and roots (Fig. 8,D). Manipulation of the cheek mucosa did not cause movement of the marginal gingiva as originally noted. The patient was instructed to return at regular three-month intervals for prophylactic maintenance.

Case 4 • A 48 year old woman had deep chronic periodontitis involving the lower right first bicuspid and first molar teeth. The second bicuspid had been removed several years previously because of caries and malposition in the arch. Roentgenographic evidence and probing revealed a deep intrabony pocket on the mesial aspect of the first molar. The buccal plate of bone was prominent, creating a saucer-shaped depression next to the tooth (Fig. 9,A). The vestibular fornix was extremely shallow and exerted a tensional pull on the alveolar gingiva over the pocket region.

Reshaping of the buccal bone crest by osteoplasty procedures and reduction of buccinator muscle pull was decided on after the patient refused to consider a fixed bridge replacement of the offending molar.

Osteoplasty procedures were carried out initially to determine further the prognosis of the intrabony pocket area. One month later the vestibule operation

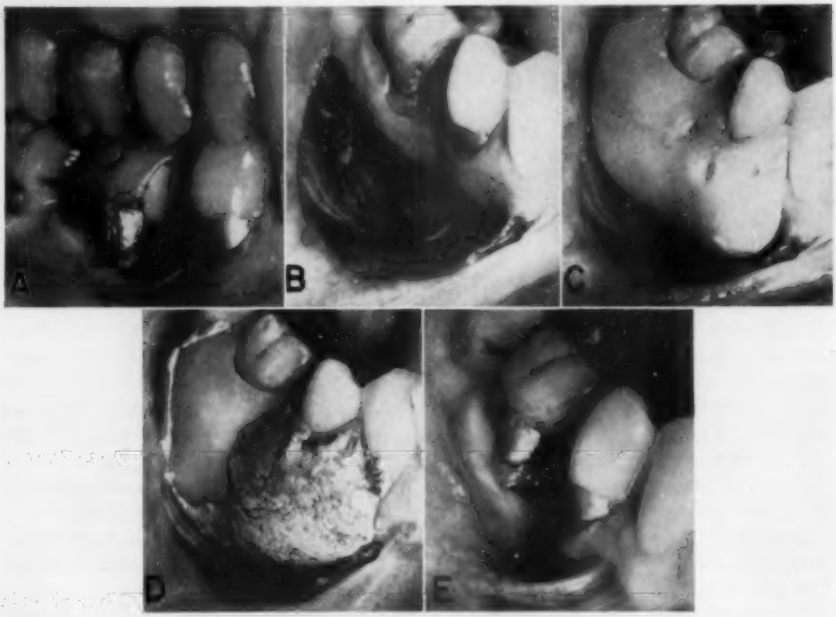

Fig. 9 • Case 4. A: Preoperative view. Vestibular mucosa inserts directly into inflamed intrabony pocket region between bicuspid and molar. B: Vestibule incision extended from second molar to cuspid. C: Splint being fitted into position. Interproximal and vestibular contours trimmed and adjusted before application of cement. D: Cement dressing with splint ligated to bicuspid. Ligatures have been covered with cement to prevent cheek irritation. E: Two months postoperative. Note improved interproximal contour free of inflammation

was performed. An incision was made from the second molar forward to the cuspid. Blunt dissection was sufficient to detach the buccinator muscle fibers from the underlying periosteum (Fig. 9,B). The acrylic splint was checked for accuracy (Fig. 9,C). The surgical dressing was applied and the splint was ligated to the bicuspid (Fig. 9,D).

The splint was retained in position for three weeks for periodic changes of the dressing. After thorough prophylaxis and home care instructions, the patient was dismissed for two months.

The recall examination revealed moderate shrinkage of the marginal gingiva in the affected area, but the floor of the vestibule appeared to have returned to its previous level. The new interproximal bony contour, however, now acted as a sluiceway for food, and the surface gingiva was firm and resistant (Fig. 9,E). It was felt that the original intrabony pocket therapy was largely responsible for the improved gingival condition.

DISCUSSION

The use of overextended splints is not mandatory in every instance. If the muscle pull is minimal or the area to be operated on is limited, the usual periodontal dressing can be applied as in routine gingivectomy procedures. The cement then can be extended down into the vestibule. A tin-foil covering will give further support in these instances. Where there is not sufficient interproximal space available to lock a cement pack securely, the splint is indispensable for retention.

Fortunately, problems pertaining to the vestibule and frenum occur most commonly in the lower anterior region, where operative procedures are rather simple and routinely successful. Reductions in the posterior mandibular region tend to creep back to their original position because of buccinator muscle pull and the anatomic slope of the external oblique ridge. It appears that retention of the splint in these regions for a longer period will help to overcome this difficulty. Success depends to a great extent on adequate incisions. Conservatism in this respect usually will find the vestibule back to its original position in a short time.

Postoperative difficulties usually are not too troublesome. Experience has shown that proper control of pain by topical application of ointment plus systemic sedation is of great value. Antibiotic prevention against infection seems to hasten the healing period and to control further any stormy postoperative sequela.

The Present-day Use of Ancient Languages • Latin, in addition to being the direct ancestor of French, Spanish, Italian and Portuguese, has contributed so much to the vocabulary and syntax of other modern western languages, particularly English, that it is almost impossible to gain an intelligent control of any of those languages without Latin.

Greek supplies major portions of our scientific and technical vocabulary.

The study of the ancient languages, Greek and Latin, brings to light, as a by-product, the mental processes of the ancients and their ways of thinking about human problems, which are often applicable today. ***Mario Pei. Language for Everybody.***

Changing theories of periodontal conditions influencing principles of management

G. R. Lundquist, M.S., D.D.S., Chicago

Periodontal conditions resulting in pocket formation are chronic in character. They pursue a course which is characterized by a more or less acute rise, reaching a peak which is followed by a decline which, in turn, is followed by improvement and a quiescent period. These characteristic reactions occur repeatedly. The condition has an underlying tendency toward recovery without treatment, except perhaps in patients who have low resistance or those who are chronically ill. Functional factors of occlusion as well as environmental factors of dirt and debris usually are instrumental in the development of these conditions. Injuries produced by such insults frequently are repeated and long continued. Often 15 to 20 years elapse before treatment is undertaken. Periodontal conditions, therefore, must be chronic in character, otherwise treatment would have been required earlier.

For the past 25 years a theory concerning the management of periodontal conditions has been predicated on interpretations made from laboratory specimens, some of which were in an advanced pathologic state. This theory presupposes a shifting line of epithelial attachment from the crown to the root of the tooth with age. Figure 1, above left, a roentgenographic illustration of the teeth and supporting tissues of a young person, shows the interseptal bone as being just short of the cementoenamel junction. A histological example of a comparable condition is shown in Figure 1, above right, which is a view of a mesiodistal section of the interseptal tissues of two bicuspids. The soft tissues fill the septal spaces to the contact point. A near zero crevice exists.

In contradistinction, Figure 1, below left, is a clinical view of the periodontal attachment in a 50 year old person with healthy supporting tissues considerably below the cementoenamel junction. Figure 1, below right, is a comparable histological example depicting the periodontal attachment well down on the surface of the root. A near zero crevice exists, and the tissues are comparatively free of cellular infiltration. These conditions are said to be normal for the two age periods. Accordingly, the soft tissues show a change of position of the soft tissue attachment from the crown of the tooth (Fig. 1, above) to the root of the tooth (Fig. 1, below) with age.

Gottlieb speaks of various successive stages of tooth eruption.[1] He implies that the tooth under normal conditions continues to move occlusally throughout life, although at a much slower rate than in childhood. During this occlusal move-

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1. Boyle, P. E., editor. Kronfeld's Histopathology of the teeth and their surrounding structures, ed. 3. Philadelphia, Lea & Febiger, 1949.

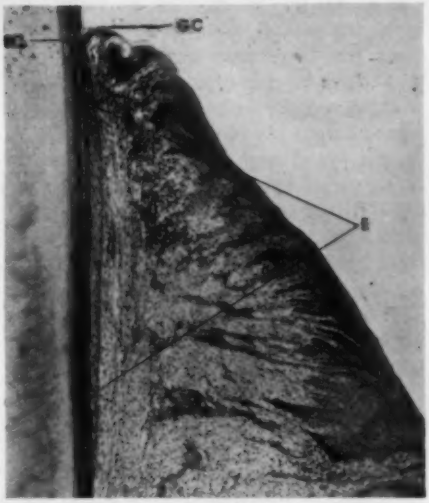

Fig. 1 • Above left: Teeth of healthy young person showing bone just short of cementoenamel junction. Above right: Mesiodistal section of two bicuspids including interseptal tissues. E, region of apparent epithelial attachment. A to E, artifact. Below left: View of healthy patient, age 50, showing recession of soft tissues and zero crevices. Below right: View of middle aged person showing gingival crest (GC), bottom of crevice (BC) and extensive zone of apparent epithelial attachment (E) to cementum of root

ment the gingival soft tissues are separated from the tooth at the bottom of the crevice. The crown is continuously worn off by abrasion; at the same time the cementum is deposited on the apex of the root. Figure 2 portrays the active and passive eruption of the teeth. Figure 2, A, illustrates a tooth that has erupted into the oral cavity. As the erupted crown portion becomes greater, the epithelial attachment becomes relatively shorter. At this stage the epithelial attachment is located at or near the cementoenamel junction. B, C and D of Figure 2 illustrate a separation of the epithelium from the tooth surface and the more or less continuous apexward proliferation of the epithelium along the cementum. This theory implies that the downward growth of the epithelial attachment occurs with-

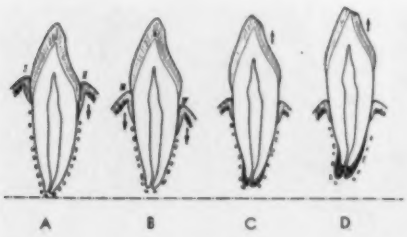

Fig. 2 • Active and passive eruption of tooth with attendant tissue changes. (Illustration courtesy of Gottlieb, B., and Orban, B. Biology of the investing structures of the teeth. In Dental science and dental art, Gordon, S. M., editor. Philadelphia, Lea & Febiger, 1938)

out deepening the gingival crevice.

So long as all these processes occur slowly and uniformly, they are supposed to be expressions of a normal process of aging. By detachment of the gingival tissues at the bottom of the crevice, a fairly uniform length of clinical crown is maintained despite abrasion. Cementum added in the apical region of the tooth helps to compensate for eruption, keeping the clinical root sufficiently long, so that the adjoining supporting tissues can adequately sustain the tooth in the act of mastication.

It follows that if dentists accept a program for the management of periodontal conditions which presupposes a shifting line of attachment from the crown to the root of the tooth with age as a physiologic norm, then rebuilding the attachment of the pathologically separated soft tissue side of a periodontal pocket to the root surface should not be expected, except for a short period comparable to the previously mentioned periods of eruption.

In addition, the downgrowth of epithelium may be, and often is, the expression of a pathologic process. This is especially true when the pockets are deep and large areas of the root are exposed to the fluids of the mouth. Such a condition (Fig. 3) shows extensive bone loss both in the vertical and horizontal directions. The diastemata also attest to the deviations in the normal relationships of the teeth and their investing tissues.

If the pocket has not progressed to the degree that treatment is no longer feasible, management predicated on the so-called physiologic shift of the line of attachment apexward requires a transfer of the crest of the gingivae to the base of the pocket. The objective of treatment based on the view that the downgrowth of epithelium may result from a pathologic condition would be to achieve a zero or near zero crevice at the expense of the soft tissue side of the periodontal pocket. Surgical excision with a sharp scalpel probably is the most effective way to achieve this result.

This type of treatment, often predicated on pathologic findings, eliminates the disease process, at least temporarily. However, if the treatment program is based on what seems to be a more nearly physiologic point of view, an entirely different operative procedure is feasible and possible. Dentists often examine mouths of 50, 60 or 70 year old patients in which the apexward shift of attachment of the periodontal tissues does not conform to the pattern just described.

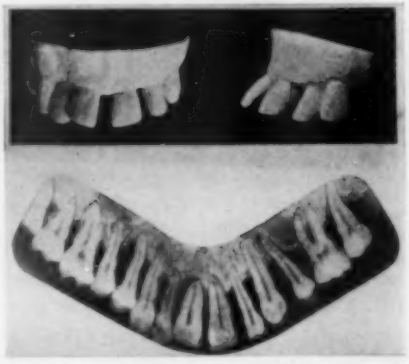

Fig. 3 • View showing extensive bone loss both vertical and horizontal

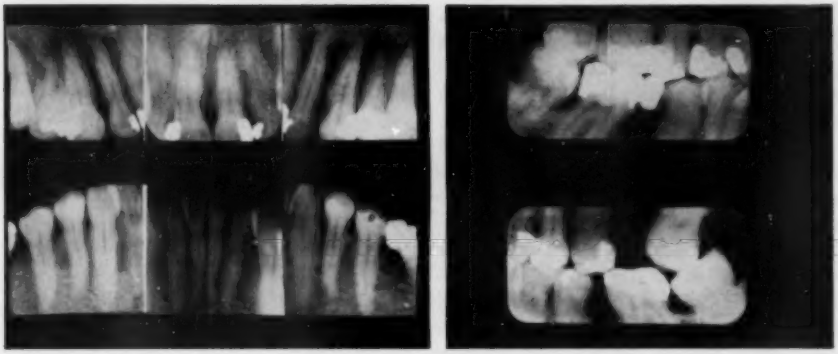

Fig. 4 • Clinical view of patient 70 years of age. Alveolar crest at or near cementoenamel junction. Compare with Figure 1, above left

The periodontal condition of a 70 year old person similar to many seen in daily clinical practice is shown in Figure 4. The soft tissue invests the gingival portion of the crowns of the teeth. The crest of the bone is located just short of the cementoenamel junction and is healthy. This condition does not imply a more or less apexward proliferation of the epithelium along the cementum. It suggests rather that the eruption and wear of teeth that occurs in the mouths of patients 50 to 70 years of age is not only a process of eruption and wear, but actually a concomitant development and growth of the investing tissues. The mechanism is illustrated in the mouth of a 50 year old person (Fig. 5). These histologic sections illustrate the apposition of successive layers of bone in the gingival region, and the apposition of layers of bone and cementum in the apical region.

If the foregoing criterion is used as the physiologic norm, it is obvious that dentists are dealing with a modified, albeit continuous, eruption of teeth. Besides the fact that healthy connective tissue does not generally permit invasion of epithelium in its domain (tumors excepted), it is well to remember that reactions to injuries—mechanical, traumatic, chemical, parasitic or bacterial—can be dealt with and that recoveries are possible. On this basis treatment programs pointed toward repair and replacement of pathologic tissue will be found more feasible than the theory of the apexward proliferation of gingival epithelium suggests.

When injuries are often repeated and long continued, epithelium becomes invasive and, hence, complicates the treatment program. It is essential, then, to recognize gingivitis early. If the condition is caused by dirt or debris, these factors should be eliminated and programs for continuous management instituted. If the causative agent is traumatic in character, it, too, is subject to control. The factor of trauma is a bit more subtle and may escape detection. Before the dentist attempts a functional analysis of occlusion, the following factors should be considered:

1. The crowns of the teeth have little or no power of repair. They are, however, subject to disease and wear. In the case of wear, both occlusal and interproximal, the efficiency of the tooth is not greatly impaired in terms of function, since bone, through the medium of the periodontal membrane, usually compensates for an apparent mesial and occlusal directional movement of teeth from the first molar forward.

2. Mechanical function seems to dominate bone, and tipping stresses tend to produce traumatic effects in the supportive connective tissues of teeth.[2] Such injuries should be considered as aseptic wounds or inflammation in its simple form. The process of inflammation is complete only when a series of events called repair have occurred. Furthermore, since certain pressures and tractions participate in the process, bite correction to eliminate tipping stresses will be effective in achieving such repairs.

FUNCTIONAL ANALYSIS OF OCCLUSION

The maxilla, the temporomandibular articulation and its attendant musculature and ligaments have developed a pattern related to the face long before the adult teeth have erupted, and, unfortunately, all these factors may not be

2. Lundquist, G. R. Connective tissue changes associated with variable occlusal stresses. J.A.D.A. 24:1577 Oct. 1937.

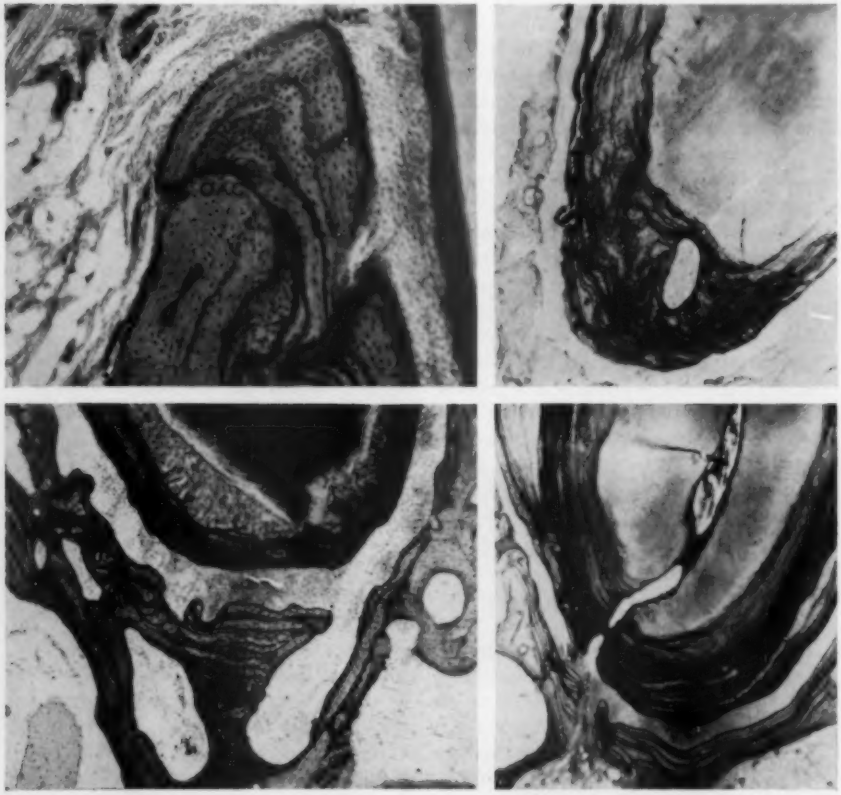

Fig. 5 • Condition in patient 50 years of age. Above left: Apposition of bone. OAC, old alveolar crest; NAC, new alveolar crest. Above right: Apposition of cementum in apical region. Below left: Apposition of bone in apical region. Below right: Apposition of bone and cementum in apical region. (Material courtesy of M. L. Aisenberg)

in harmony. Thompson[3] postulates that a mandibular rest position is developed that is characteristic and more or less constant for each individual. He points out that it is a relaxed musculature, or musculature in a state of equilibrium, and not the teeth, which determine the rest position of the mandible, and that such a rest position is established long before any teeth have erupted. The rest position remains rather constant after the natural teeth are lost. Thompson[3] suggests that an average interocclusal space of 2 to 3 mm. is traversed as the mandible is moved from its rest position to the position of occlusion. He implies that, at the termination of this movement, the teeth, under normal conditions, should interdigitate without interference, and in such a manner that no interceptive contacts of teeth are made or deflections of the mandible are noted.

Presumably, then, as Posselt[4] has pointed out, closing movements from the rest position to intercuspal position normally should take place as a rotation around a transverse axis which passes through the condyles. Hereafter in this article this position will be referred to as the rest position hinge axis. Sliding movements of the condyles caused by cusp interference when the jaws are closing from the rest position to the intercuspal or occlusal position are characterized by Thompson[3] as abnormal paths of closure. On the other hand, Posselt,[4] Beyron,[5] Granger,[6] Schmidt[7] and Bowman[8] imply that closure of the teeth from the rest position is a habitual movement (not boundary or terminal), one that is not necessarily normal, and, therefore, it is subject to variation. Consequently, to accept the actual rest position (hinge axis) for finding centric position seems inadvisable.

Posselt[4] points out that a centric intermaxillary relation has been defined as the most retruded position of the mandible from which it can perform lateral movements. Consequently, the term centric relation should not be used for the rest position. Granger[6] has defined the terminal hinge axis as an arrow point relationship in the region of the mandibular condyles in opening and closing movements of the mandible. Posselt,[4] Granger,[6] Schmidt,[7] McCollom[9] and Brown[10] have pointed out that opening and closing can be performed both passively and actively as hinge movements with the condyles in terminal or retruded position to a degree probably averaging as much as 20 mm. Since such a position is both accurate and more stable than the habitual rest position axis, bite correction based on terminal hinge axis registrations should yield the most satisfactory results. Herein is the crux of the problem.

If the observations of Thompson[3] and his co-workers are accepted and the rest position hinge or rotation axis is used as a basis for management of occlusal interferences of teeth, then several factors must be considered. First, the rest position is exactly what it is defined as being. It is not, therefore, a functional position. Actually some translatory or sliding movement must occur as the condyle is moved from terminal hinge axis rotation center to that of the rest position hinge axis. It would seem, then, that the rest position could only be achieved in a range between the functional extremes of occlu-

3. Thompson, J. R. Temporomandibular disorders, diagnosis and dental treatment. In Temporomandibular joint, Sarnat, B. G., editor. Springfield, Ill., Charles C Thomas, 1951.

4. Posselt, Ulf. Studies in the mobility of the human mandible. Acta odont. scandinav. (Suppl. 10) vol. 10, 1952.

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6. Granger, E. R. Functional relations of the stomatognathic system. J.A.D.A. 48:638 June 1954.

7. Schmidt, W. G. F. Use and location of the terminal hinge axis relationship. In Problems of occlusion. Lecture, Northwestern University Dental School, 1956.

8. Bowman, Vernon R. Roentgenographic study of the movement of the mandible from physiologic rest position to the occlusion of the teeth. M.S.D. thesis, Northwestern University Dental School, 1948.

9. McCollom, B. B. Oral diagnosis. J.A.D.A. 30:1218 Aug. 1943.

10. Brown, S. W. Disharmony between centric relation and centric occlusion as a factor in producing improper tooth wear and trauma. D. Digest 52:434 Aug. 1946.

sion, with the teeth in protrusive and retrusive relationship. In addition, the mandibular condyle, together with its meniscus, must drop out of the position of occlusion to achieve rest position. Posselt[4] reported that Donovan found a "vertical drop" of the condyles in 20 out of 25 children. In spite of this observation, Donovan considered that a "rotary movement from this position is normal for adults."

To correct occlusal interferences on the basis of the rest position hinge axis means that the correction will be directed in favor of the anterior component of force related to habitual patterns of closure. This type of bite correction would continue to favor mesial and occlusal drift of the teeth and, if the supporting tissues were equal to the occasion, the cusps as well as the incisal surfaces of the teeth would wear off.

This would also be the case when dealing with a condition in which the mandible moves from rest position to make initial contact of the anterior teeth after traversing an interocclusal space of 2 or 3 mm. As contact is made, the direction is reversed distally and vertically to bring the bicuspids and molars into occlusion. This is achieved as the incisal and labial surfaces of the lower anterior teeth slide along the lingual surfaces of the upper incisors. In instances where the interocclusal space ranges from 5 to 8 mm., a condition of overclosure has been assumed.

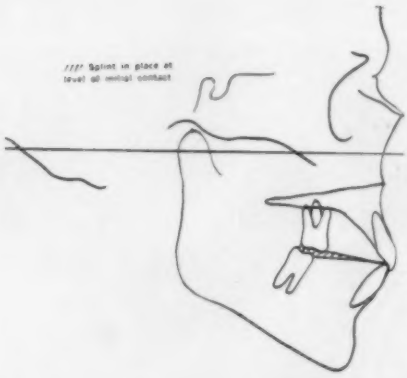

Fig. 6 • Tracing of cephalometric roentgenogram illustrating an approach used by J. R. Thompson to reduce interocclusal space in bicuspid and molar region to equivalent of initial contact level; achieved when lower incisors are moved from rest position of mandible to point of initial contact with upper incisors

To correct similar conditions in which the interocclusal space is not excessive, Thompson[3] has advocated building the occlusal surfaces of the bicuspids and molars to the position of the initial contact of the anterior teeth or using bite plates on the anterior teeth, thus restraining further eruption of these teeth while permitting further eruption of the bicuspids and molars to such a plane of occlusion (Fig. 6). Such a solution may be a satisfactory and logical way to solve the problem. The erupting teeth with their developing supporting tissues should, however, be equilibrated on the basis of the terminal hinge axis rotation center. The bite plate must not be in the mouth when bite correction is made, and its use need not be continued after bite correction. If the teeth are not equilibrated on this basis, and if they and their supporting tissues are permitted to erupt to the occlusal plane developed by the habitual closure pattern—rest position to occlusion, the anterior component of force will continue to operate from the molar region forward. This often results in obliteration of cusps and tooth form (Fig. 7).

In this habitual pattern of mandibular closure from rest position to occlusion, an anterior component of force tends toward an end-to-end bite. This has been called normal because of the rather healthy condition of the supporting tissues. Often, freedom in occlusal movements can only be achieved by employing cuspless tooth forms and by building bicuspids and molars on an occlusal plane of concentric spheres.

Gratzinger[11] has demonstrated that the use of bite plates similar in construction to the Hawley retainer may be developed so that a bite table which prevents further eruption of the six upper anterior teeth will occlude at approximately right angles to the long axes of the six lower anterior teeth. Since the force is directed parallel to their long axes, these teeth are well equipped to sustain such stress; at the same time, rest is allowed for the bicuspids and molars which are out of occlusion. Such bite plates are not to be used while eating and preferably are to be worn only at night. This program tends to reduce the effects of occlusal trauma. The reduction of trauma, together with good mouth hygiene habits and the elimination of periodontal pockets, seems to be effective in the maintenance of oral health so long as the use of a properly constructed bite plate is continued.

In these and similar instances, as well as in those where there is very limited interocclusal space, unless a careful analysis is made of the positional relationship of the teeth with respect to the terminal hinge axis, tooth interferences will be overlooked, especially in the bicuspid and molar regions.

In the following instance, a young man had an interocclusal clearance of 3 mm. As he closed his jaws from mandibular rest position to the position of occlusion, he habitually avoided what proved to be a centric terminal hinge axis interference between the distoincisal surface of the lower right cuspid and the mesiolingual incline of the lingual cusp of the upper right first bicuspid. This and other interferences were eliminated one after another, those that occurred in centric occlusion and in protrusive and right and left lateral excursions, until freedom of movement was achieved (Fig. 8).

To avoid centric interferences, the patient had developed the habit of moving his jaw from its rest position forward and upward, making contact with the incisors

Fig. 7 • Extensive wear noted in mouth of 59 year old person for whom no treatment had been given. Note obliteration of tooth form involving anterior teeth as well as bicuspids and molars

only. The incisors were the only teeth showing evidence of wear. It has been said that such a path to the point of initial contact constitutes a normal path of closure inasmuch as it traverses about 2 mm. before initial contact is made. The wear of the incisors is supposed to result from normal contact. In this instance the habitual path of closure was developed to avoid the previously described interference. Hence, in the avoidance of the occlusal interferences an anterior component of force was developed as a habit pattern. To correct occlusal interferences, using rest position hinge axis rotation center in this instance would only favor the anterior vector of force and eventually, if successful, would obliterate tooth form. It is questionable whether such a program is necessary or wise.

If centric interference is eliminated and if provision is made for lateral and protrusive excursive movements of the mandible without interferences in regard to a terminal hinge axis centric relationship, cusps need not be obliterated. The jaw need not move forward and upward

11. Gratzinger, Max. Use of plate appliances in the treatment of periodontal trauma. In Periodontics for the general practitioner. Lecture, Northwestern University Dental School, 1956-1957.

to avoid tooth interferences. The possibility of compensating for the anterior component of force related to the habitual pattern of closure is challenging. Under such circumstances the mesial and occlusal drift of the bicuspids with accompanying pathologic conditions need not occur, and restorations need not be jeopardized by the tipping stresses they are usually subjected to in habitual patterns of jaw closure.

Figure 9 illustrates the effect of pathologic tipping stress. The upper right and left first bicuspids show markings on the mesial inclines of both their buccal and lingual cusps. The marking is more intense on the mesial incline of the buccal cusp of the upper left first bicuspid, and it is delineated more definitely on the mesial aspect of the lingual cusp of the upper right first bicuspid. Bone related thereto, as depicted by roentgenographic evidence, exemplifies this fact clearly.

Figure 9, below, illustrates the fact that bone resorption occurs in the region adjoining the distal surfaces of the first bicuspids. This resorption occurs on the side opposite the application of force. It seems paradoxical that the teeth do not move in the direction of the applied force.

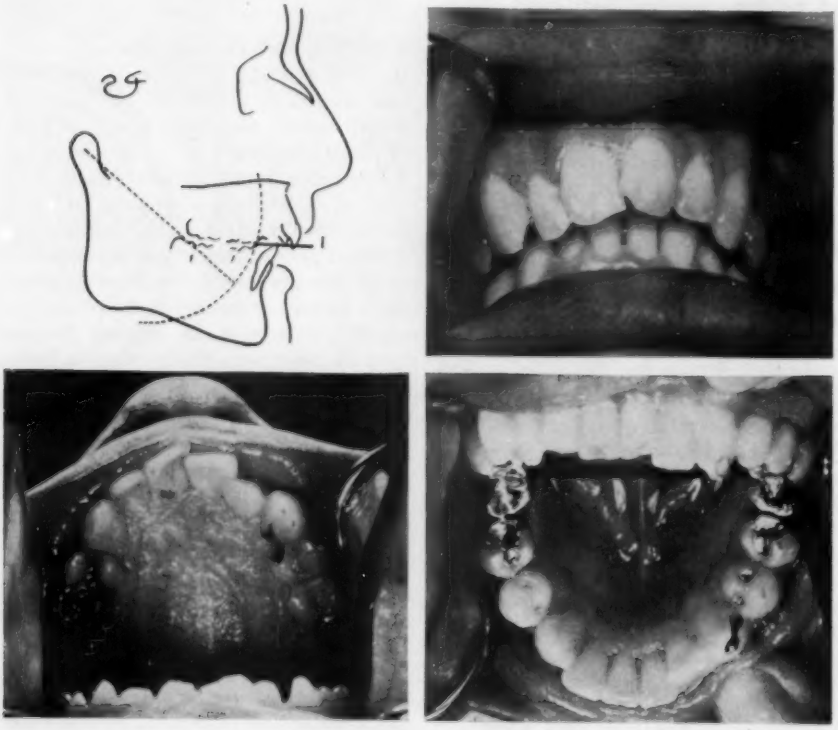

Fig. 8 • Above left: Cephalometric tracing showing contact interference. To achieve closure, mandible must move forward. I, point of interference. Above right: Note retrusion of lower jaw in terminal hinge axis centricity. Jaw swings freely on hinge axis before initial contact of teeth occurs. Below: Note marking along mesial inclined plane of lingual cusp of upper first bicuspid. This path is traversed by distoincisal inclined plane of lower cuspid before full occlusion of all teeth occurs

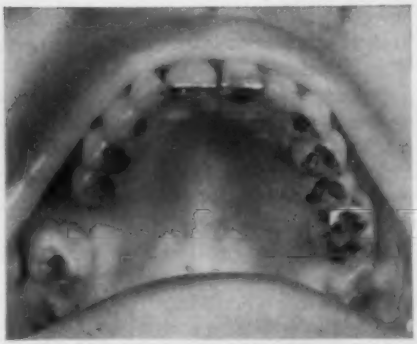

Fig. 9 • Above: Interferences on mesial aspect of right and left first bicuspids. These interferences were related to distoincisal-inclined planes of lower right and left cuspids. Below left: Note bone loss on distal aspect of first bicuspid—effect of tipping stress directed toward mesial aspect of lingual cusp of this tooth. Contact is open on distal side and closed on mesial side. Below right: Note loss of bone at distal aspect of bicuspid—side opposite direction of applied force. Open contact on distal side and closed on mesial side

The reason they do not is clear. There are no periodontal pockets nor any adjoining bone resorption on the mesial surface of the first bicuspids. The vector force was in a mesial to distal direction as the distoincisal edge of the lower cuspids collided with the mesial incline surfaces of the lingual cusps of these bicuspids in the patient's habitual pattern of closure. Even so, the net result left more attachment on the mesial surfaces, with correspondingly tight contacts, whereas on the distal surfaces there was less periodontal attachment, and open interproximal spaces. Obviously the surfaces which have the greatest amount of periodontal attachment aid in determining the positional relationship of the teeth.

Much has been made of the fact that periodontal trauma relates mainly to the supportive connective tissues of teeth, and that it is usually expressed in certain regions of pressures and traction. Under such circumstances, traumatic injuries are not confined to the region of the gingival crevices or pockets where pathologic conditions may or may not exist. Apparently the fact is overlooked that pathologists[12] define inflammation as a physiologic reaction to injury, and that it runs its course only when a series of events called repair has occurred. The irritant may be mechanical, including trauma which is physical in character, chemical, parasitic or bacterial. Therefore, the injuries to the investing tissues of teeth by trauma (tipping stresses) are inflammatory in character. They are,

12. Adami, J. George, and McCrae, John. Textbook of pathology for students of medicine, ed. 2, rev. Philadelphia, Lea & Febiger, 1914.

however, aseptic injuries.[2] Such injuries, in the beginning at least, are not invaded by infection.

Any agent, in this instance tipping stress, capable of injuring or killing cells, sets up an inflammatory reaction.[12] Cells once killed are irritants by reason of the chemical products resulting from their disintegration, and therefore they must be eliminated. Thus, in trauma, two factors assist one another in the production of inflammation. When the minimum of destruction is wrought, that is, when no infection is present, as in an aseptic wound, inflammation exists in its simplest form, in which repair occurs.

Figure 10 illustrates most of these factors clearly. Plus (+) signs illustrate pressure zones; minus (—) signs illustrate traction zones. The periodontal membrane space is greatly increased in these regions. Replacement fibrosis of connective tissue is present, which is indicative of long-continued and often repeated injury. There is a lack of bone and cementum growth to narrow the periodontal membrane space which makes for mobility of the tooth. Under the circum-

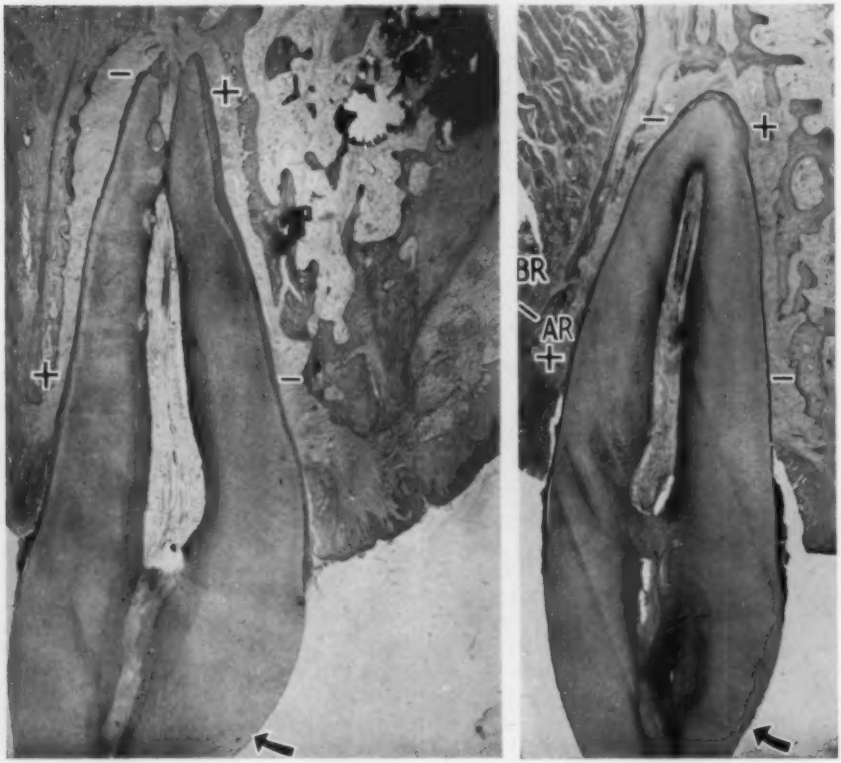

Fig. 10 • Left: Plus (+) signs are pressure zones, minus (—) signs are traction zones. Note increased width of periodontal membrane space in these areas as well as lack of bone and cementum growth. Right: Plus (+) signs are pressure zones, minus (—) signs are traction zones. Note mesiogingival bone resorption at AR and bone replacement (BR) to compensate for labial drift

stances it must be concluded that trauma is the dominant factor in the development of the periodontal disease, periodontitis. The gingival crevice is comparatively shallow and is, therefore, secondary in the aggregate in regard to the pathologic condition involving the investing tissues of this particular tooth. The fact that the tooth is mobile, however, leads to avoidance of its use in function, and accumulation of debris occurs in the gingival crevice. This, in turn, favors the development of a gingival pocket.

Another misconception is that clinically dentists cannot, in an untreated mouth, separate injuries caused by trauma from those caused by neglect and uncleanliness. For this reason the classic histopathologic evidence of inflammation related to contaminated tissues is to be expected. Even though injuries caused by dirt and debris are concomitant with those caused by trauma, they may be treated separately.

It is well known that the dentist may succeed in developing zero or near zero gingival crevices surrounding mobile teeth in instances where traumatic injuries played the dominant role in the periodontal pathologic process. On the other hand, he may control factors related to trauma and thus succeed in stabilizing teeth without fully eliminating the periodontal pocket. It follows logically that the problem should be managed on the basis of systemic and environmental as well as traumatic factors, the latter two being conditioned by the inheritance capacities related to the former.

CONCLUSIONS

1. The shifting line of attachment of the soft tissues, from the crown of the tooth to the root of the tooth with age, places limitations on treatment programs for developing new attachment to the tooth root of the detached soft periodontal tissue.

2. Another hypothesis that does not accept as normal the shifting line of attachment from the crown of the tooth to the root of the tooth with age envisages the possibilities of new soft tissue attachment to the side of the tooth root because, with eruption and occlusal drift of the teeth, there is a concomitant development of the gingival tissues including the gingival bone crest as well as the bone and cementum in the apical region.

3. Traumatic injuries to the periodontium are considered as a factor in causing inflammation in its simplest terms, that is, aseptic injuries not contaminated by infection. Since trauma is the dominant factor in this type of periodontitis, it follows that bite corrections to relieve "tipping stresses" are indicated: (1) equilibration on the basis of a terminal hinge axis centric relationship is effective; and (2) the use of bite plates to achieve rest for control of bruxism is also effective.

4. Even though injuries caused by dirt and debris are associated with those of trauma, they may be treated separately, sometimes to advantage.

Science and Truth • Science is teaching man to know and to reverence the truth, and to believe that only as far as he knows and loves it, he can live worthily on earth. Only with the help of truth and science can man vindicate the dignity of his spirit. *Moses Harvey. Humanity of Man.*

Dental education today and tomorrow

G. R. Lundquist, M.S., D.D.S., Chicago

Those who read this issue of THE JOURNAL cannot help but be impressed with the large body of knowledge developed in the field of periodontics. This fact, together with the fact that endodontists have developed another impressive bit of knowledge in their field, leads to the question how this great volume of information has come about—particularly since most dental schools have greatly undervalued these fields in their undergraduate curriculums. In the minds of many dental educators, periodontics and endodontics are regarded as offshoots or appendages of operative and prosthetic dentistry.

Unfortunately, as dental education is conceived and taught in dental schools, most of the students' clinical training is in the fields of operative and prosthetic dentistry. This type of training was true 40 years ago and it is true today. No one questions the necessity of such training. Under existing circumstances, however, periodontics and endodontics had to develop as separate entities in dentistry, building their own research programs and literature before dental schools would consider them seriously.

Dental education for the past 40 years has not been broadened sufficiently to include these two entities in their curriculums on the basis of their true worth. Several reasons for this oversight exist. Considerable time is required for the student to develop sufficient skill to practice operative and prosthetic dentistry. The student concentrates most of his time and attention on these two branches of the profession with the result that operative and prosthetic dentistry is largely the dentistry practiced by the general practitioner today. This is indeed unfortunate.

The whole body of knowledge known as clinical oral pathology, with its background of histopathology, includes periodontics and endodontics. It should include dental caries but does not because that subject is taught as a separate entity. Since the pathology of dental caries is but one aspect of clinical oral pathology, it should be so considered. When operative and prosthetic dentistry are being taught, the pathology of the carious lesion, the tooth relationship to adjoining and occluding teeth and all existing temporomandibular functional factors should be considered. In addition, the possibilities related to treatment programs should be predicated on the present pathologic conditions of the supporting tissues, with consideration given to the possibilities of their successful management.

This type of training would be quite different from today's educational programs which in many instances develop dentists who think in terms of what should be done to individual teeth, instead of considering how the existing pathologic condition relates to the health of the entire mouth and to the general health of the patient. The tendency to glorify oral surgery, particularly exodon-

tics, has influenced dentists to underestimate and even ignore the treatment possibilities which modern endodontics and periodontics place at their disposal. Consequently they lean in the direction of eliminating teeth and toward the fabrication of restorative appliances.

It is not difficult to hold a roentgenogram before a light, make a cursory analysis of a so-called rarefied area or a thickened periodontal membrane space, evaluate it as an infective zone, and then order extraction of certain teeth. This type of operative procedure is deplorable insofar as the management of the main sources of oral pathology are concerned. It need not be so. Coolidge and Kesel,[1] Grossman[2] and a multitude of others have shown that most such teeth can be treated successfully without detriment to the patient's health.

Periodontists at long last have discovered that the correction of abnormal functional factors of occlusion, together with proper mouth hygiene, will salvage countless teeth that now are being extracted. Malposed teeth may even be synchronized with muscle patterns in jaw movements so that they may be maintained by patients on a functionally sound basis.

If dental diagnostic clinics and examining rooms were conducted under the auspices of a well-qualified oral pathology department, many of the foregoing difficulties would be avoided. Obviously only an experienced examiner, one unusually well qualified in the field of oral pathology, would be required to head such a department. His training should be such as to enable him to evaluate treatment possibilities in terms of periodontics, operative dentistry, endodontics and prosthetic dentistry as they relate to functional factors of occlusion in harmony with the temporomandibular joint requirements.

State Board requirements at this time can be met by most dentists—particularly by the most recent graduates because of their excellent operative and prosthetic dentistry training and skills. This condition exists because dental schools have been content to educate dental students in this manner. If the profession is to progress beyond the stage of specializing in restorative dentistry, it must give as much time to preventing the loss of teeth as it now gives to the fabrication of their replacements. The knowledge is available in the fields of periodontics and endodontics. It requires only the willingness to incorporate properly this knowledge in our teaching programs.

1. Coolidge, Edgar D., and Kesel, Robert G. Textbook of endodontology, ed. 2. Philadelphia, Lea & Febiger, 1956.

2. Grossman, L. I. Root canal therapy, ed. 4. Philadelphia, Lea & Febiger, 1955.

Taste for Reading • The best preventative of gossip and talebearing—the common recreation of the idle and the ignorant, and the bane of those good feelings and kind offices which sweeten and augment the pleasures of a good neighborhood—is to inculcate, early in life, a taste for useful reading. Books remind us of our duties and afford useful employment for the mind in hours of rest or of leisure; and when the habit of reading is once acquired, its pleasures and advantages become more and more perceptible and enticing, as we advance in useful knowledge. ***Jesse Buel (1837).***

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Editorials

Approval of fluoridation by WHO will speed world-wide assault on dental caries

The unanimous approval given water fluoridation last August by the World Health Organization[1] marks another tremendous step forward in man's fight against dental caries.

The WHO committee on the public health aspects of water fluoridation concluded that "the effectiveness, safety and practicability of fluoridation as a means of preventing dental caries, one of the most prevalent and widespread diseases in the world, is now established—no other vehicles or techniques for the prophylactic application of fluorides can at present substitute for the fluoridation of drinking water as a public health measure."

The experts based their opinion on a study of hundreds of controlled fluoridation programs, some of which have been in progress for more than 12 years, in 17 countries. In the United States alone, 32 million people in more than 1,500 communities are using mechanically fluoridated drinking water.

Programs are also in operation in one or more communities in the following countries: Australia, Belgium, Brazil, Canada, Chile, Colombia, El Salvador, Germany, Great Britain, Japan, Malaya, Netherlands, New Zealand, Panama Canal Zone, Sweden, Venezuela. Norway and Switzerland are about to start similar projects.

This list shows that fluoridation is approved by responsible health officials throughout the world and indicates, according to the WHO experts, that "no other public health procedure during the initial stages of its application has had such a background in time or extent."

The experts add that the most convincing evidence of the safety of water fluoridation comes from places where people have drunk naturally fluoridated water all their lives. No one has ever detected any ill-effects, except for mottled teeth in areas where the natural fluoride concentration is too high.

After thoroughly evaluating the observations and experiments made by leading scientists—biologists, physiologists, toxicologists, chemists, veterinarians, pathologists, physicians and dentists—in many countries of the world, the WHO Committee concluded that the findings of those researchers "fit together in a consonant whole that constitutes a great guarantee of safety, a body of evidence without precedence in public health procedures."

These conclusions, reached by the international health authorities, will help to set at rest the apprehensions and misgivings felt by those communities in the United States and elsewhere which so far have cautiously refrained from endorsing and adopting this proved public health dental preventive measure.

In light of the overwhelming mass of favorable evidence collected from world-wide sources, on which the WHO authorities based their favorable opinion, it seems incredible, in this enlightened age, that any community favored with a public water supply logically could withhold from its children the benefits of fluoridation.

1. News of dentistry. WHO experts issue report. J.A.D.A. 55:574 Oct. 1957.

Nineteen fifty-seven; golden anniversary of one of the great controversial figures in dentistry, William H. Taggart

Nineteen hundred and fifty-seven marks the golden anniversary of William H. Taggart's contribution to the dental profession—his cast gold inlay technic. The intervening years have softened both the acclaim and the clamor that followed in the wake of his initial announcement. To say that Taggart's technic revolutionized the practice of dentistry is to put it mildly. To say that the manner in which he presented his technic to fellow practitioners caused a near revolution in the profession is also an understatement. Be that as it may, it is fitting that dentists this year re-recognize the genius of the man who conceived a gold casting inlay technic and fired the profession to adopt it.

Although Taggart may not have been the first to make a gold inlay by the casting method, it was he who practically perfected the technic, who published a report of it, who gave clinics from coast to coast, and who taught the profession to take advantage of the new, effective method of restoring lost tooth structure.

Dentistry has never been the same since; world dentistry was lifted onto a higher plane; operative dentistry was improved and the casting art was eagerly seized upon by the various phases of prosthetic dentistry.

"It revolutionized dentistry, created higher standards of craftsmanship and was, no doubt, the beginning of a new era. With the advent of the casting process as given by Dr. Taggart, it became necessary to revamp the crown and bridge department of every dental university in the world."[1]

"Suddenly and without previous intimation, the profession was freed forever from the hard work incidental to gold foil operations. . . . There is hardly a restorative operation which has not been changed by the casting process, and today . . . its influence is still felt."[2]

Space is lacking to relate the details of Taggart's decision to apply for patents on his casting process; of the flood of offers from manufacturers to make and sell the

apparatus and from dentists to buy the casting machine; of Taggart's offer to permit any dentist to use the Taggart method in return for a payment of fifteen dollars; of the series of lawsuits that ensued, and of the eventual defeat of the Taggart patents. At this distance from the events, dentistry draws the veil of charity over the mistakes of Dr. Taggart, dentistry praises with a whole heart the gift which he gave.

"Legally, of course, Taggart had no right to a patent monopoly," states Bremner, a leading Taggart historian.[2] "But it was he who taught the profession to cast inlays, which was without doubt the greatest single contribution to dental progress that had been made by any individual. Yet, in spite of this invaluable service, he was dragged through the courts, his old age embittered by litigation, and he was left to die in poverty, while the members of the profession were earning millions from the methods which he alone popularized. Unfortunately, the dental profession had no choice but to defend its freedom.

"Without doubt, Taggart himself was a good deal to blame for his predicament . . . because he had marred his services to dentistry by the attempt to commercialize the profession. Still his errors have been buried with him, while his wonderful contribution lives on, and his place among the immortals of dentistry is secure."

Although 1957 marks the golden anniversary of an operative technic which advanced immeasurably dentistry's service to society, more importantly, it marks the golden anniversary of advancements of even greater significance to dentistry. It marks the fiftieth anniversary of the final transformation of a craft into a profession. It marks the golden anniversary of a period of enlightenment in which it became unquestionable to all that a dentist as a member of a healing profession cannot withhold from his fellow practitioners the products of his discoveries. Henceforth it became part and parcel of every dentist's consciousness "that the dentist has the obligation of making the fruits of his discoveries and labors available to all when they are useful in safeguarding or promoting the health of the public. . . ."[3]

1. Vorhees, Frank H. History and progress of the cast gold inlay. J.A.D.A. 17:2111 Nov. 1930.
2. Bremner, M. D. K. The story of dentistry, ed. 3, rev. Brooklyn, Dental Items of Interest Publishing Co., 1954, p. 262.
3. Principles of ethics, the American Dental Association.

The Association's Relief Fund program rounds out a half century of service

A full fifty years has slipped swiftly into history since an earthquake, a fire, a great city's demolished dental offices and an appalled and generous profession produced one of the American Dental Association's most gratifying intraorganizational activities —its Relief Fund program. No other national professional organization, insofar as is known, has a project of comparable kind, scope or merit.

Starting with a small sum of a little less than $4,000—the unspent balance of a fund raised by dentistry nationally to aid San Francisco dentists whose offices were damaged by the 1906 earthquake and fire—the Fund has grown to approximately $1,000,000. By law the Fund is designated "to provide aid of an emergency and temporary character to dentists and, when individual circumstances demonstrate unusual need and the resources of the fund permit, to deserving dependents of

dentists." Only the interest from the Fund can be used, the principal must remain intact.

Only the confidential records of the Council on Relief of the Association can disclose the names of beneficiaries of the program. Only those pages can show the amount dispensed each year for relief purposes. But the records of the Council, no matter how carefully kept, will never be able to show the great good which this program has accomplished each year for the greater part of the past half century. Because the project is firmly established on a sound financial basis, its benefits will grow greater in the future.

In commemorating the Fund's first fifty years of altruistic service, members of the profession can justly feel proud of its accomplishments and of themselves for making those accomplishments so successful. No contributor will ever know the good he has accomplished, the burdens he has lightened or the pain he has relieved—which is as it should be, as it makes each contribution and each contributor all the greater.

This month the Relief Fund program enters its second half century of service. The Council on Relief has mailed invitations to all members of the Association to participate in the project by continuing to contribute to the Fund. It is hoped that every dentist will respond generously so that the excellent record established in the first half century will be exceeded in the second.

Periodontics for the general practitioner

Five of the sixteen papers on periodontal disease, published in this issue of THE JOURNAL, were presented as a symposium before the Section on Periodontics at the ninety-seventh annual session of the American Dental Association. They form the core of this issue. Together with the other twelve supporting papers, they constitute a handbook—in fact, practically a textbook, on periodontal disease. If every general practitioner studied these papers and applied in his practice the recommendations therein, great strides would be made in bringing under control a disease that has long since reached epidemic proportions in the United States.

As Hine asserts, "enough is understood of the etiologic factors of periodontal disease so that the general practitioner of dentistry today can acquire the knowledge and develop the skill required to prevent the loss of teeth because of periodontal disease in most of the patients who seek his services early and follow his instructions scrupulously. . . . Most dentists spend too little time in teaching patients how to care for their mouths and even less time in teaching the value of home care. Ordinarily, healthy gingival tissue can be maintained if any one of many different toothbrushing technics is used correctly."

The general practitioner who prefers to refer to the specialist the patient with periodontal involvement could still help to keep down the incidence of the disease if he would but observe Obin's suggestions to use care in all phases of restorative dentistry so that trauma to soft tissue and alveolar bone may be minimized.

The practitioner of general dentistry, as Wiebusch observes, must be well qualified as a periodontist and must understand the anatomy, histology and physiology of the healthy periodontium. The excellent papers on all aspects of the periodontium and its pathology in this issue of THE JOURNAL merit careful study. The reader will be richly rewarded for his investment of time.

The dental Relief Fund, 1907-1957: fifty golden years of service

The golden anniversary of the Association's Relief Fund program is drawing to a close. Fifty years has elapsed since the dentists of America elected to relieve the burdens of their financially distressed brothers. During that period hundreds of needy dentists and their dependents have received financial assistance through the Fund from their professional associates. During that period the initial modest nucleus of less than $4,000 with which the program was started, has grown to more than a million dollars. Although most members of the Association contribute annually to the Fund, many know little of its background.

First dental Relief Fund seal, 1913. Designed by James McManus of Hartford, Conn.

"A full fifty years," editorializes THE JOURNAL[1] in this issue, "has slipped swiftly into history since an earthquake, a fire, a great city's demolished dental offices and an appalled and generous profession produced one of the American Dental Association's most gratifying intraorganizational activities—its Relief Fund program. No other national professional organization, insofar as is known, has a project of comparable kind, scope or merit."

The Relief Fund program did not appear spontaneously. For years, altruistic members of the profession thought and spoke of a plan that could assist worthy dentists who had become financially destitute. By the turn of the twentieth century, such sentiments were more or less common. In 1903 L. G. Noel, president of the National Dental Association,[2] recognizing the need for a mechanism to aid indigent members of the profession, recommended in his presidential address that a committee on aged and infirm members be appointed. Two years later W. E. Boardman, as president,[3] recommended that some plan be formulated for the collection of a fund known as the "Benevolent Fund" for the provision of aged and infirm members. The stage was set. It only remained for the flames that brought desolation to a great American city to spark a program designed to relieve the want and desolation which visits an occasional dentist.

On learning of the terrible disaster that befell San Francisco April 18, 1906, a group of Chicago dentists, in whose minds the memory of the 1871 fire was still imbedded, formed a general Dental Relief Committee and immediately sent San Francisco dentists $2,000.[4] The dentists

A special report of the Council on Relief summarizing the first 50 years of service of the American Dental Association's Relief Fund program.

1. Editorial. Association's Relief Fund program rounds out a half century of service. J.A.D.A. 55:702 Nov. 1957.

2. Transactions, National Dental Association, 1903, p. 17.

3. Transactions, National Dental Association, 1905, p. 41.

4. Asbell, M. B. Early history of relief activities for American dentists. Outlook & Bul. South. D. Soc. (N.J.) 26:3 Jan. 1957.

of San Francisco also established a Relief Committee under the chairmanship of John S. Marshall. The National Dental Association appointed a similar committee under the chairmanship of J. D. Patterson, of Kansas City, Mo. Within months dentists throughout the nation contributed $15,208.45 to their distressed brothers. When all necessary relief had been provided, a sum of $3,969.75 remained in the hands of the San Francisco Dental Relief Committee,[5] which, by resolution, was turned over in 1907 to the National Dental Association to form the nucleus of a National Relief Fund. Although the nation's dentists instantly and generously rushed to the relief of their San Francisco brothers, the idea of a national dental relief program failed to arouse the imagination or the response that Dr. Noel and other proponents of the plan had hoped. In all fairness to the dentists of that day, it must be explained that there were several good reasons why the program failed to receive the full support of the profession. The chief reason was the type of organization under which the Association labored. In 1907 the National Dental Association had a listed membership of only 739.[6] In 1912 the listed membership amounted to only 1,191.[7] Such members were representatives of the various state and local dental societies and dental schools. The general practitioner, unless he happened to be such a representative, was not a member of the National Association.

Between 1907 and 1913, when the National Dental Association was reorganized, both the relief plan and the Relief Fund lay practically dormant. During those years various plans were suggested to encourage contributions and vitalize the plan. In 1911,[8] President E. S. Gaylord appointed a new committee under the chairmanship of L. G. Noel, the man who originally fostered the Relief Fund plan. The Noel committee proposed that state dental societies contribute annually an amount equal to one dollar per member. Dr. Noel's state, Tennessee, concurred but few of the other state societies did so.

At the time of the Association's reorganization in 1913, the Christmas seal idea was proposed by R. Ottolengui, of New York,[4] and to Charles McManus, a dentist of Hartford, Conn., went the task of designing the first seal. Since then, each November a packet of new and differently designed Christmas seals, or Relief Seals, has been mailed each member to promote contributions to the Fund. Receipts resulting from the first year's sale of seals in 1913 amounted to $2,-

5. Transactions, National Dental Association, 1907, p. 19.
6. Transactions, National Dental Association, 1907, p. 180-189.
7. Transactions, National Dental Association, 1912, p. 355.
8. Transactions, National Dental Association, 1911, p. 407.

Second Relief Fund Committee, 1914

Dental Relief Fund Seals. Upper left, 1923. Upper right, 1933. Lower left, 1943. Lower right, 1953

862.67.[9] The following year, 1914-1915, the total amount received from the sale of seals was but $1,476.69—an average of about nine cents from each of the Association's 16,000 members.[10] This was the beginning of several disheartening years. Perhaps the most critical point was reached in 1915, when the chairman of the Relief Fund Committee reported[11] that it had been suggested that the Fund be dissolved and the amount on hand as of July 1915—$10,908.08—apportioned to the states that had contributed most toward the Fund. The suggestion was counteracted by one from the committee which proposed appointment of subcommittees in each state to work with the national committee. Suddenly the turning point was reached. Whereas the committee in 1917[12] had reported a Relief Fund of but $20,000, by 1921 it had grown to about $65,000.

As reported in 1921 by Otto U. King, general secretary of the National Dental Association,[13] the plan provided for the creation of an endowment fund of $100,000. When that amount was obtained, the interest therefrom, plus the money collected from the continued sale of Christmas seals, was to be made available for relief purposes. Two years later—in 1923—the Fund was within $3,000 of the desired goal. The Association's *Transactions*[14] of that year reported nearly $97,000 in the Relief Fund endowment. By that time the provisions of the program were tightened to permit only the interest from the principal sum to be used for relief purposes. Realizing that the interest from so small an amount as $100,000 would provide assistance to only a limited number of worthy applicants, the committee recommended that "each application for relief should carry with it the endorsement of the local and state society in which state the applicant resides, and that said local and state society each be prepared to contribute an equal amount thus donated by the parent organization from this fund. This will not only make the available amount go three times as far, but it will also serve as a check on any particular local or state society drawing on the fund for more than that to which it is justly entitled." This plan, which requires the financial participation of the national, state and local dental organizations, remains, with slight modification, in effect to this time.

By 1924 the Fund had reached $100,000 and the first benefits, amounting to about $2,700, were distributed. Annual grants increased slowly but steadily, reaching $7,558 by 1931. Annual income derived from the sale of Christmas seals also increased slowly but steadily, reaching $16,665.00 in 1931.

In 1935 an amendment to the plan[9] broadened its scope and increased its

9. Kremer, Leo W. American Dental Association Relief Fund. Report of the Council on Relief. Mimeographed report. 1951.

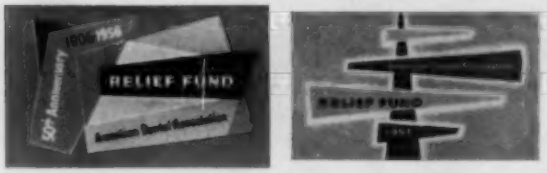
10. Transactions, National Dental Association, 1915, p. 383.

11. Transactions, National Dental Association, 1915, p. 384.

12. Transactions, National Dental Association, 1917, p. 24.

13. King, Otto U. Say it with: Christmas seals to widows, orphans and indigent dentists. J.A.D.A. 8:1032 Dec. 1921.

14. Transactions, American Dental Association, 1923, p. 44, 106.



Latest Relief Fund seals. Left: Golden Anniversary seal, 1956. Right: Current seal, 1957

benefits. This amendment provided that 50 per cent of the contributions received each year be returned to the constituent society of which the contributor is a member, thus enabling the constituent societies to build up relief funds of their own.

All aspects of the relief program have steadily grown—the Fund itself, annual contributions and annual disbursements. By 1938 the Fund amounted to approximately $405,000; by 1948 it had reached $635,020.94 and by July 1957 at the conclusion of the program's golden anniversary it had grown to $1,009,574.48.

Annual contributions in 1938 amounted to $23,152.65. By 1948 they had increased two and a half times, to $61,321.39, and by July 1957 to twice that amount, $128,-362.73—a growth which is a great tribute to American dentists. The sharp increase in annual contributions within the past ten years is attributable largely to the more effective use of better lines of communication between the Association's Council on Relief—formerly known as the Relief Commission—and Association members. The increase in contributions also is due in part to the establishment, in 1948, by the Council of an annual national quota of $100,000 and the establishment of annual quotas for each constituent society.[15] Four years elapsed following the decision to establish an annual quota before the annual Christmas seal—now known as the Relief Seal—drive went over the top.

Concurrently the annual number of beneficiaries and the annual amount of benefits have increased. In 1938-39 Association grants amounting to $12,345 were made to 72 beneficiaries. In 1948 these figures had risen to $28,578 for 81 beneficiaries, and in 1956-57 to $41,-743.00 to 106 grantees. Each of these grants, of course, is matched by the constituent society of which the recipient is a member.

The procedure for making grants briefly is this:[9] Applications for relief originate with the component society, or with the constituent society where no component exists. The only exception is that applications may be made directly by eligible individuals who are not located within the jurisdiction of a component or constituent society. All members of the dental profession and their dependents, and former dependents of deceased dentists, are eligible for aid if, because of misfortune, age or physical or other disabling condition, they are not wholly self-sustaining.

Investigators of the component and constituent societies report on each case, and the recommended amount of the relief grant is certified by these societies on the basis of the report. The application then is remitted to the American Dental Association's Council on Relief for final consideration. If the grant is approved, the payments are made in monthly installments for a period of six months on the first grant. Subsequent grants may be made up to 12 months.

In 1948 the Board of Trustees[16] of the Association established the Relief Fund as an independent entity, thereby

15. Hansen, Magnus C. Providing assistance from the Relief Fund. Mimeographed report to Conference of State Society Officers, 1955, p. 10-16.

16. Editorial. American Dental Association Relief Fund safeguards relief contributions. J.A.D.A. 37:710 Dec. 1948.

further safeguarding relief contributions. For years monies contributed to the Relief Fund had been deposited by the Association in a separate account. These monies were transferred by the Board to a new living trust known as the "American Dental Association Relief Fund," which is protected legally from attachment. As under prior arrangements, only the interest from this fund can be used for the relief of worthy dentists and their dependents who are in financial distress. In 1954 the Association[17] established a policy of financing all the seal campaign expenses and administrative costs of the program. This policy represents an annual contribution of approximately $20,000.

Thirty-two years ago, in December 1925, C. N. Johnson, then editor of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION,[18] editorializing on the Christmas seals and the Relief Fund, pinpointed man's obligation to his brother and extolled the virtues of the Relief Fund program: "It brings a glow to a man's heart when he contributes his mite voluntarily toward the relief of suffering of any kind, and particularly when he knows, as he must in this instance, that every dollar is used with the most scrupulous care for the concrete object of beneficence. The painstaking and businesslike way in which our Relief Commission has administered this activity has inspired the utmost confidence on the part of everyone familiar with its work."

Nothing, during the past third of a century, has transpired to diminish that confidence, and much has occurred to increase it. As the Council on Relief closes the Relief Fund books at the conclusion of its golden anniversary, it can do so with the full realization that the program will be privileged to do greater good and provide greater benefits in the 50 years that lie ahead.

17. Transactions, American Dental Association, 1953, p. 290.

18. Johnson, C. N. Christmas seals. J.A.D.A. 12:1544 Dec. 1925.

MANY NATIONS REPRESENTED AT INTERNATIONAL DENTAL CONGRESS; U. S. DENTISTS PARTICIPATE IN PROGRAM, HONORS, SOCIAL EVENTS

Scientific presentations, essays, demonstrations, clinics and exhibits attracted about 10,000 persons from 72 nations to Rome in September to attend the XIIth International Dental Congress. Almost 1,000 dentists from the United States and their wives participated.

The meeting was sponsored jointly by the Fédération Dentaire Internationale, which held its XLVth annual session just prior to the opening of the Congress on September 7, and the Associazone Medici Dentisti Italiani.

Many Americans were elected to honorary positions by the Organizing Committee of the Congress. Harold Hillenbrand, Association secretary, was elected an honorary vice-president of the Scientific Session. Those elected to the position of honorary presidents of various scientific sessions include: *oral surgery:* James R. Cameron, Philadelphia; *growth and development as related to orthodontics* (round table discussion): W. M. Krogman, Philadelphia; *dental caries—prevention:* H. Trendley Dean, Chicago; *dentomaxillofacial orthopedics—therapy:* B. H. Broadbent, Cleveland; *testing and standardization of dental materials* (round table discussion): W. T. Sweeney, Washington, D. C.; *anatomy, histology and physiology:* Harry Sicher, Chicago, and *public dental health services and socio-odontology:* John W. Knutson, Washington, D. C.

Honorary vice-presidents of the various scientific sessions include the following: *dental caries—etiology and pathology:* R. W. Bunting, Ann Arbor, Mich., Harold Hodge, Rochester, N. Y., F. J. McClure, Bethesda, Md., F. S. McKay, Colorado Springs, Colo., and R. F. Sognnaes, Boston; *oral surgery:* L. M. FitzGerald, Dubuque, Iowa; *dentomaxillofacial orthopedics—etiology and prevention:* Allan Brodie, Chicago, R. E. Moyers, Ann Arbor, Mich., and J. R. Thompson, Chicago; *the Armed Forces dental services:* Brig. Gen. Thomas P. Fox, U. S. Army Reserve, Philadelphia, and Maj. Gen. Marvin E. Kennebeck, U. S. Air Force, Washington, D. C.; *dental caries—operative and restorative therapy:* G. M. Hollenback, Sherman Oaks, Calif.; *histopathology and physiopathology:* J. L. Bernier, Washington, D. C., T. J. Hill, Brecksville, Ohio, and J. P. Weinmann, Chicago; *dental caries—prevention:* B. G. Bibby, Rochester, N. Y., and R. Stephan, Bethesda, Md.; *dentomaxillofacial orthopedics — diagnosis:* O. W. Brandhorst, St. Louis, and T. M. Graber, Kenilworth, Ill.; *military sections:* Rear Admiral R. W. Malone, Washington, D. C., Col. J. K. Sitzman, U. S. Air Force, New York, Brig. Gen. J. S. Cathroe, U. S. Air Force, Washington, D. C., and Maj. Gen. J. M. Epperly, Washington, D. C.; *correlation of oral and general diseases:* Lester W. Burket, Philadelphia, and Lester Cahn, New York; *anesthesia:* J. Roy Doty, Chicago; *dentomaxillofacial orthopedics—therapy:* Oren A. Oliver, Nashville, Tenn.; *periodontal disease—etiology and pathology:* Balint Orban, Chicago, and Helmut Zander, Rochester, N. Y.; *dental materials and instruments:* F. A. Peyton, Ann Arbor, Mich., and R. W. Phillips, Indianapolis; *anatomy, histology and physiology:* Isaac Schour, Chicago; *periodontal disease — therapy:* Harry Lyons, Richmond, Va., A. H. Merritt, New York, and S. C. Miller, New York; *roentgenography:* L. M. FitzGerald, Dubuque, Iowa; *public dental health serv-*

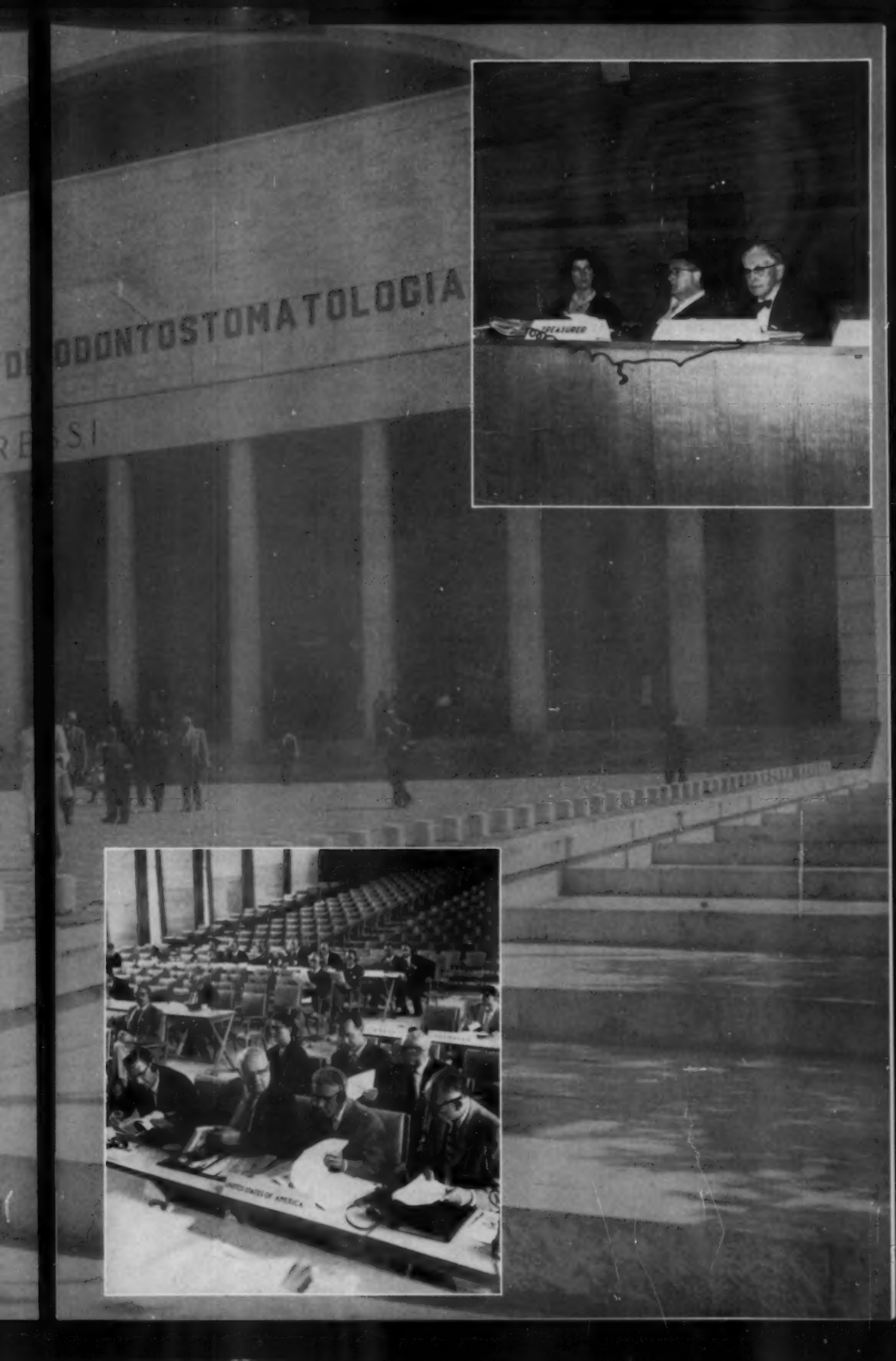
F.D.I. XII CONGRESSO INTERNAZIONALE DI

PALAZZO DEI CONGRE

F.D.I. **XII**

Congresso Internazionale di Odontostomatologia
International Dental Congress
Congrès International d'Odontostomatologie
Internationaler Zahnärzte-Kongress
Congreso Internacional de Odontoestomatología

ROMA **7-14 settembre 1957** **Zona E.U.R.**


ODONTOSTOMATOLOGIA
TREASURER

ices and socio-odontology: P. E. Blackerby, Jr., Battle Creek, Mich.; *prosthodontics—partial dentures:* O. C. Applegate, Ann Arbor, Mich.; *odonto-stomatological education:* R. A. Dixon, Washington, D. C., and G. D. Timmons, Philadelphia; *public dental health services and social dentistry:* Harold Hillenbrand, Chicago, J. Petersen, Geneva, Switzerland, and Carl Sebelius, Nashville, Tenn.; *prophylaxis and diagnosis of oral cancer:* S. J. Kreshover, Bethesda, Md., H. E. Martin, New York, Kurt Thoma, Brookline, Mass., and David Weisberger, Boston; *children's dentistry:* J. C. Brauer, Chapel Hill, N. C.; and *endodontics:* E. D. Coolidge, Evanston, Ill., L. I. Grossman, Philadelphia, and R. G. Kesel, Chicago.

Five U. S. dentists presented formal reports as part of the scientific program of the XIIth International Dental Congress. Doctor Salzmann, former editor of the *New York Journal of Dentistry,* spoke on dentomaxillofacial orthopedics. F. A. Arnold, Jr., Washington, D. C., director of the National Institute of Dental Research, presented a paper on fluoride compounds. Dental materials and instruments were the topic of a paper presented by George C. Paffenbarger, Washington, D. C., chief of the American Dental Association research program at the National Bureau of Standards. Former Association president, LeRoy M. Ennis, Philadelphia, spoke on roentgenology as related to dentistry, while George W. Teuscher, Chicago, dean of the Northwestern University Dental School, presented a paper on pedodontics during the scientific session.

The American Dental Association named five official delegates, five alternate delegates and two observers to the meeting of the Fédération Dentaire Internationale, and selected 50 delegates and alternate delegates to the XIIth International Dental Congress. Harold Hillenbrand and Harry Lyons headed both delegations. The other three official delegates to the Fédération included LeRoy M. Ennis, Obed H. Moen and Oren A. Oliver.

ELECTION OF OFFICERS

On September 14, at its closing session, the Fédération Dentaire Internationale unanimously elected Thure Brandrup-Wognsen, Stockholm, president to succeed Albert Joachim, Brussels. W. Stewart Ross, London, was elected a vice-president. Reelected to this post were LeRoy M. Ennis, Obed Moen, Watertown, Wis.; Erich Müller, Hamburg, and Jean Deliberos, Paris. Gerald Leatherman, London, and Jack Stork, Aerdenhout, Holland, will continue in their positions as secretary and treasurer, respectively. Reelected as assistant treasurer and assistant secretary were Miss Dorothy Parrott, London, and W. Riis Klausen, Copenhagen. H. H. Stones, Liverpool, was reelected editor of the *International Dental Journal.*

Elected honorary vice-presidents were Dr. Oliver and the retiring president of the Congress, Luigi Benedetti, Rome. F. H. Witt, Cologne, Germany, was elected an honorary member.

FUTURE MEETINGS

Cologne was selected as the site of the next Congress, to be held in 1962. This group meets once every five years. The 46th annual meeting of the Fédération Dentaire Internationale will be held in Brussels from August 27 to September 2, 1958. Details of this meeting can be obtained from C. Gysel, 14, Avenue Le Grelle, Anvers, Belgium, or from G. H. Leatherman, 35 Devonshire Place, London.

Plans for the 47th annual meeting of the Fédération Dentaire Internationale also have been initiated. This meeting will be held in New York in September, 1959, in conjunction with the centennial celebration of the American Dental Association. Details of this meeting can be

obtained from Harold Hillenbrand, Association secretary, 222 E. Superior St., Chicago, or from Dr. Leatherman.

AUDIENCE WITH POPE

Several thousand dentists gathered in the Basilica of St. Peter's, Rome, on Sunday afternoon, September 8, for a special audience granted by Pope Pius XII. In his address to the delegates, the Pope commended the developments made in dentistry, stating that they were ". . . a significant factor in promoting and maintaining human health and welfare . . ."

A translation of the Pope's address, delivered in French, will be presented in the December issue of THE JOURNAL.

SOCIAL HIGHLIGHTS

Among the many social events that highlighted the meeting, two left an indelible impression in the minds of the delegates. One was a special performance of Verdi's "Aida," staged under the stars at the Terme di Caracalla (Caracalla's Baths). Amid the splendid ruins of Emperor Caracalla's public baths, opened in 217 A.D., Association members witnessed a performance of this famous opera by a cast of hundreds.

Another social climax of the Congress was a reception at the U. S. Embassy given by the Chargé d'Affaires in honor of the American Dental Association. About 1,500 dentists and their wives attended.

Other social functions included a tea and fashion show for the dentists' wives, an official banquet and a grand ball. Receptions were given by the mayor of Rome and various government officials, including the Italian ministers of health and defense.

On pages 710 and 711 are some photographs that capture the spirit of the Congress. In the background is the main hall where the general meetings and scientific session were held. Harry Lyons and Harold Hillenbrand appear at the upper left. At the upper right are Dorothy Parrott, Jack Stork and Oren A. Oliver. Shown conferring during a session intermission are Harold Hillenbrand, LeRoy Ennis, Obed Moen, Harry Lyons (first row), and Doris Nugent, John Knutson and Howard Higgins (second row).

Association Affairs

TELL PLANS FOR MEETING OF A.D.A. CHAIRMEN, SECRETARIES

Eight papers will be presented at the second conference of chairmen and secretaries of the Association's 17 councils, to be held December 16 and 17 at the Central Office.

Included on the program are the following topics and speakers: "Objectives and Organization of the American Dental Association," William R. Alstadt, president-elect; "Policies, Rules and Bylaws Related to Councils," Harold Hillenbrand, Association secretary; "Meetings and Reports of Councils," Reginald H. Sullens, associate secretary, Council on Dental Education; "What Does the Council Chairman Expect from the Council Secretary?" Jay H. Eshleman, chairman of the Council on Dental Health; "What Does the Council Secretary Expect from the Council Chairman?" Peter C. Goulding, secretary, Council on Scientific Session; "Public Relations for Councils," Herbert B. Bain, director, Bureau of Public Information; "Budget and Finance for Councils," John E. Rush, associate business manager, and "Development of Council Programs," Dr. Hillenbrand.

Louis M. Cruttenden, Association assistant secretary, is chairman of the committee on arrangements for the conference.

During the second day of their three-day meeting at the Association's Central Office, participants in the Workshop on the Education and Certification of Dental Assistants divided into three groups to discuss: knowledge and abilities needed for office management and secretarial duties; knowledge and abilities needed for dental operating room procedures, and knowledge and abilities needed for dental laboratory and roentgenographic procedures. On the final day, the chairman of each committee read a report of his group's findings and recommendations to the entire audience.

TRAINING OF ASSISTANTS DISCUSSED AT WORKSHOP

Approximately 70 dental educators, dentists, dental assistants and dental hygienists convened at the Central Office on October 2-4 to attend the first Workshop on the Education and Certification of Dental Assistants, sponsored by the Association's Council on Dental Education.

Maynard K. Hine, chairman of the Council's Committee on the Training of Dental Assistants, explained that the group had been assembled to undertake the task of defining the objectives of an education program for the training of dental assistants.

The first day was devoted to a general meeting during which participants received a summary of the problem and progress made to date. Results of the

three workshop groups which met on the second day were reported to the full convention on the last day of its meeting. These findings will be evaluated by the Council to assist it in preparing future policy recommendations for consideration by the Association's House of Delegates in establishing the official policy of the dental profession regarding the education and certification of dental assistants.

NINE ARTISTS ACCEPT BID TO DESIGN SPECIAL STAMP

The design for a special U. S. postage stamp to commemorate the Association's centennial meeting in 1959 will be selected from the sketches of nine well known artists. The artists, including five from Europe, who have accepted an invitation of the American Dental Association to submit designs, include: Karl Bickel, Switzerland; Albert Decaris, Paris; Edward R. Grove, Drexel Hill, Pa.; Jan Van Krimpen, the Netherlands; Antonio Petruccelli, Mount Tabor, N. J.; Edmondo Pizzi, Rome; H. T. Shimek, Vienna; William P. Welsh, Ky.; and Willie W. Wind, Chicago.

The winning design, to be submitted to the U. S. Post Office, will be selected by a jury of four, including; Richard Cabeen, Chicago, stamp editor of the Chicago *Tribune;* Bernard Davis, Philadelphia, director, National Philatelic Museum; Jean Van Noten, Englewood, N. J., distinguished designer, and the president of the American Dental Association.

The Association is requesting the Post Office to issue the commemorative stamp early in 1959.

CHILD'S FIRST DENTAL VISIT TOPIC OF PAMPHLET

Particularly designed for parents of young children, *Pointers for Parents,* a pamphlet prepared by the American Dental Association in cooperation with the American Society of Dentistry for Children, tells how to prepare a child for his first visit to the dentist. The need for early and frequent dental care for children and the need for the development of proper attitudes and habits concerning dental health also are stressed.

Copies of this pamphlet and information regarding price can be obtained from the Association's Order Department 88, 222 E. Superior St., Chicago 11.

JOHN WALLACE DIES IN EAST; KNOWN FOR LEADERSHIP

John R. Wallace, widely known member of the dental profession, died suddenly at his home in Winchester, Mass., on October 17 at the age of 57.

Dr. Wallace, a graduate of the Harvard Dental School, was prominent in Association and professional activities during his lifetime. In 1947, he was chairman of the committee on publicity for the annual session and in 1948 he was elected

John R. Wallace

a member of the advisory committee to the Association's Bureau of Public Information. At the time of his death, he was chairman of the Council on Membership, a position he had held since 1952.

A past president of the Massachusetts Dental Society and of the American Denture Society, Dr. Wallace devoted much time to the advancement of his profession. He was a member of the prosthetic department at Harvard University for

more than 20 years. In 1947 he was appointed by the governor of Massachusetts to serve on a commission to revise the dental law in relation to dental laboratories for that state. He also served as a consultant in prosthetics for the Veterans Administration in Boston.

Civic and charitable activities also received Dr. Wallace's attention. He was a leader in government affairs in Winchester and a member of several Masonic organizations.

Funeral services were held at the Winchester Unitarian church, of which he was an active member.

ADDITIONAL HISTORICAL ILLUSTRATIONS SOUGHT

Response to a request in the July issue of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION for pictures to illustrate a history of the Association has been gratifying. Thus far, pictures of Association meetings held in 1864, 1880, 1886 and 1893 plus an original membership certificate of the Dental Protective Association, dated 1900, have been received.

The committee in charge of preparing the history thanks those who have responded and asks other members to search their attics and scrapbooks for additional pictures. These illustrations should be mailed to Lon W. Morrey, Association editor, 222 E. Superior St., Chicago 11.

Dental Societies

THIRD DENTAL EDUCATION WORKSHOP SLATED FOR APRIL

"Professionalized Dental Teachers for the Dentist of Tomorrow," is the theme of the third of three workshops for the improvement of dental education. Sponsored by the Henry Spenadel Fund for the Advancement of Education in Dentistry, First District Dental Society (New York), trustee and administrator, the aim of the workshops is to stimulate greater participation by the dental profession in the study of educational problems and the improvement of dental education in general.

The third workshop will be conducted at the Hotel Statler, New York, on April 11, 1958. Two panel sessions will be held. "Instructional Methods in Dental Education" is the subject of the morning session, which will be moderated by Gerald D. Timmons, dean of the School of Dentistry, Temple University, Philadelphia, and Joseph J. Obst, Brooklyn. The afternoon session will be devoted to "Dental-Teacher Training for Dental School Faculties," and will be moderated by Russell A. Dixon, dean of the School of Dentistry, Howard University, Washington, D. C., and Ormonde J. McCormack, Syracuse, N. Y.

Admission is free. Additional information may be obtained by writing to the Dental Education Workshops, First District Dental Society, Hotel Statler, New York 1.

Association president-elect William R. Alstadt (l.) and J. Roscoe Tipton, president of the Texas Dental Association, talk over plans for the Dallas Mid-Winter Dental Clinic to be held January 26-29, 1958.

WISCONSIN SOCIETY SPONSORS DENTAL FOUNDATION

A nonstock, nonprofit organization, designed to conduct or to assist others in conducting, charitable, educational or scientific projects including but not necessarily limited to dental science and public health has been organized by the Wisconsin State Dental Society. Known as the Wisconsin Dental Association Foundation, Inc., this organization has no members as such, but consists of a board of trustees composed of (1) the officers of the state dental society, (2) the members of the state society's executive council, (3) an elected representative from each component dental society and (4) 20 or less trustees-at-large who may or may not be members of the state dental society. In this way, the Wisconsin Society hopes to extend its educational, scientific and charitable activities beyond the confines of its membership.

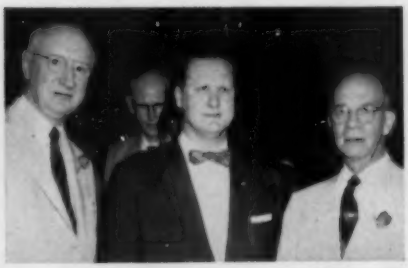
An initial board of trustees was appointed by the society's executive council to serve until after the first annual meeting of the trustees. Included on this board are: J. D. Kelly, La Crosse; R. A. Mason and J. S. Semrau, Milwaukee, and M. W. Smith, Janesville. Kenneth F. Crane, executive secretary of the state society, is an ex officio member.

The foundation will be supported by voluntary contributions of the state dental society members.

PHILADELPHIA NAMES CHAIRMEN FOR 1958 MEETING

The Greater Philadelphia Annual Meeting committee of the Philadelphia County Dental Society has named Vincent G. Lawler chairman of the board and Arthur C. Benson general chairman for its 1958 annual meeting.

The meeting, which will be held March 25-28, 1958 at the Sheraton Hotel, will feature a two-day postgraduate course on full dentures to be conducted by Vincent Trapozzano and a course on periodontics to be presented by Frank Beube.



Conferring between sessions of the West Virginia State Dental Society meeting, held at White Sulphur Springs, are (l. to r.) Arthur F. Schopper, trustee, sixth district; William R. Alstadt, Association president-elect, and Charles R. Singleton, president of the West Virginia Society.

Dental Education

DENTAL SCHOOLS ANNOUNCE PROGRAMS FOR WINTER-SPRING

Georgetown University • Postgraduate courses in oral rehabilitation, partial denture prosthodontics, orthodontics for the general practitioner, dental therapeutics and prescription writing, and occlusal equilibration in relation to periodontics and prosthodontics have been scheduled for the winter-spring program. Information on dates and tuition rates may be obtained from the chairman, postgraduate committee, 3900 Reservoir Rd., N.W. Washington 7, D. C.

Illinois • Applications are being accepted for the two and three year full time courses in oral surgery to be offered by the University of Illinois beginning in September, 1958. Both programs carry credit toward a Master of Science degree. Further details are available from Daniel M. Laskin, department of oral and maxillofacial surgery, College of Dentistry, 808 S. Wood St., Chicago 12.

Loyola • Two postgraduate refresher courses have been scheduled for December by the

Members of the New England Dental Advisory Commission will conduct a manpower survey to determine both the number of dentists and dental hygienists needed in the region in the next ten years and the educational facilities required to train them. The study will be carried out by a grant from the W. K. Kellogg Foundation. Members of the commission, appointed by the New England Board of Higher Education, include (seated, l. to r.): D. L. Field, Rhode Island Dental Society; Sen. H. S. Moskol, member of NEBHE from Rhode Island; Miss Louise W. Hord, director, Forsyth School for Dental Hygienists; E. Y. Blewett, University of New Hampshire, chairman of the commission; F. M. Erlenbach, Connecticut Department of Health; Rep. Lucia Cormier, member of NEBHE from Maine; Rep. Bernice V. Bromley, Vermont. (Standing, l. to r.): W. I. Sawabini, director, University of Vermont School of Dental Hygiene; M. J. Zazzaro, member of NEBHE from Connecticut; R. O. Greep, dean, Harvard School of Dental Medicine; A. H. Garcelon, Maine Department of Health; T. W. Clune, Rhode Island Department of Public Health; W. J. Pelton, chief, division of dental resources, U. S. Public Health Service; R. H. Sullens, associate secretary, Association Council on Dental Education; R. H. Kroepsch, executive secretary, NEBHE; H. Grant, president-elect, Maine Dental Society; W. Farrington, New Hampshire Dental Society; C. D. Marshall-Day, dean, Tufts University School of Dental Medicine. Consultants not present when the picture was taken include: I. W. Eichenbaum, Connecticut Dental Association; G. J. Fink, Massachusetts Dental Society; Rep. W. S. Mirsky, Massachusetts; R. Neumeister, Vermont Dental Society; P. E. Blackerby, Jr., director, division of dentistry, Kellogg Foundation and S. Peterson, secretary, Association Council on Dental Education.

university's School of Dentistry. Histopathology of inflammatory and neoplastic diseases of the oral cavity will be offered on December 2, 3 and 4. Attendance will be limited to 10 and the tuition will be $150. On December 6, 7 and 8, a workshop course in preventive orthodontics will be offered. Tuition and supplies for this course will be about $85. Applications for both courses may be directed to the director, Postgraduate Division, 1757 W. Harrison St., Chicago 12.

Minnesota • The dental and medical faculty of the University of Minnesota will present a short laboratory and lecture course in advanced oral pathology during the week of April 28 through May 2, 1958. Both lectures and pathologic slide studies will be included. Tuition will be $50. Interested individuals may contact Robert J. Gorlin, chairman, division of oral pathology, School of Dentistry, Minneapolis.

Northwestern • Three courses of interest to the general practitioner will be presented at Northwestern University School of Dentistry in November and early December. These include: recent advances in medicine, recent advances in dental materials and technics, and high speed instrumentation in operative dentistry. Dates of these courses are November 18, 19 and 20, December 2 and 3, and December 5 and 6, respectively. Further information may be obtained from the director of dental postgraduate study, 311 E. Chicago Ave., Chicago 11.

Pittsburgh • Applications are now being accepted by the graduate division of the School of Dentistry for study in the fields of oral surgery, orthodontics, pedodontics, periodontics and prosthodontics leading to the Master of Science and Doctor of Philosophy degrees. Nondegree, full-time 12 month courses in general anesthesia and in general anesthesia

and basic sciences also are available for qualified dental graduates. Additional details may be secured from the director of Graduate Education, School of Dentistry, Pittsburgh 13.

Texas • A seminar in partial denture prosthesis will be offered June 9-13, 1958 by the University of Texas Dental Branch. The tuition fee is $150, $50 of which must accompany the application blank. Attendance is limited to 10. For further details, contact Sumter Arnim, director, Postgraduate School of Dentistry, P.O. Box 20068, Houston 25.

Virginia • A six-day course in complete denture construction will be offered by the Medical College of Virginia School of Dentistry from March 3 through 8, 1958. Tuition for the course is $150. Correspondence should be directed to H. T. Knighton, director, postgraduate instruction, Richmond, Va.

STERLING-ROCK CENTER PLANS FUTURE PROSTHETIC COURSES

The success of its two-week summer school program in maxillofacial prosthetics is responsible for the scheduling of two additional courses in this field by the Sterling-Rock Falls Prosthetic and Rehabilitation Center. A five-day workshop will be offered January 26-30, 1958, and an intensive one-month course will be offered August 4-29, 1958.

Additional information regarding course contact, tuition and financing may be obtained from Edwin N. Cooper, executive director of the Center, 303 W. 2nd St., Rock Falls, Ill.

SUBSCRIPTS • The Dental and Oral Surgery Service of Mount Sinai Hospital, New York, is accepting applications for internships and residency for the calendar year beginning July 1958. Applications should be addressed to Max Fuchs, assistant director, 11 E. 100th St., New York 29. . . . George W. Teuscher, dean of the Northwestern University Dental School, has announced the appointment of Richard G. Earnshaw, of Manchester, England, as visiting associate professor of dental materials. Dr. Earnshaw has performed extensive research on chrome casting alloys and impression materials.

International

PARIS DENTAL CLUB RENEWS REQUEST FOR U. S. SPEAKERS

Replies to an article which appeared in the March issue of THE JOURNAL have prompted the American Dental Club of Paris to again request dentists from the United States who plan to visit Paris to serve as essayists or to present clinics at meetings of the club.

Jean Roger, club president, has indicated that several speakers were recruited earlier this year, but the club would like to obtain additional speakers for the winter-spring months. All meetings of the club, which convenes the first Thursday of each month, are conducted in English. It is composed largely of dentists practicing in Paris who have studied in American schools. Present membership is about 60.

Interested dentists are requested to write to Dr. Roger at 174 Boulevard Haussmann, Paris.

ALL INDIA CONFERENCE TO BE HELD IN FEBRUARY

The thirteenth All India Dental Conference will be held during the second or third week of February, 1958, at Poona, under the direction of the Poona Branch of the All India Dental Association. Chairman of the conference is P. W. Joshi and J. B. Jagos is organizing secretary.

SUBSCRIPTS • A correction . . . W. Stewart Ross of Great Britain was erroneously identified as past president of the

British Dental Association on page 261 of the August issue of THE JOURNAL. Doctor Ross is past president of the Southern Counties Branch. . . . Persons interested in attending the second Asian Dental Congress and the Asian-Pacific Dental Conference, to be held simultaneously in Manila from March 24 to March 28, 1958 may contact Harold Hillenbrand, Association secretary, 222 E. Superior St., Chicago 11, for additional information.

Research

ADVISORY BOARD FOR N.I.D.R. INTRAMURAL PROGRAMS NAMED

Six nationally known leaders in the basic sciences and clinical procedures have been appointed to the Board of Scientific Counselors of the National Institute of Dental Research, Bethesda, Md., according to Seymour Kreshover, associate director.

This board will advise on intramural programs in accordance with a recommendation of the Special Committee on Medical Research which was appointed by the National Science Foundation in 1955.

Members of the board include Thomas J. Hill, chairman of the American Dental Association's Council on Dental Research, chairman; J. L. T. Appleton, professor of microbiology and dean emeritus, Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania; Floyd D. Ostrander, vice-chairman, Association Council on Dental Therapeutics; Reidar F. Sognnaes, associate dean, Harvard School of Dental Medicine; Wallace D. Armstrong, chairman of the department of physiological chemistry, University of Minnesota, and Allan Brodie, chairman of the department of orthodontics, University of Illinois.

NAGLE, NUGENT APPOINTED TO NATIONAL ADVISORY COUNCIL

Surgeon General Leroy E. Burney of the Public Health Service, U. S. Department of Health, Education and Welfare, has announced the appointment of Raymond J. Nagle and Robert L. Nugent to the National Advisory Dental Research Council. Members of the 12-man Council advise and make recommendations to the Surgeon General regarding research grant activities carried out under the sponsorship of the National Institute of Dental Research, Bethesda, Md.

Dr. Nagle is dean of the College of Dentistry and professor of prosthetic dentistry at New York University. He recently was honored by approximately 1,000 alumni at a dinner commemorating his fifth anniversary as dean. In addition to his academic duties, Dr. Nagle is president of the Greater New York Academy of Prosthodontics, president of the Pan-American Odontological Association and a consultant in prosthodontics for the Veterans' Administration.

Dr. Nugent, executive vice-president of the University of Arizona, is active in the American Association for the Advancement of Science, the American Chemical Society, the Arizona State Board Examiners in Basic Sciences and the Arizona College Association.

National Defense

REED WELCOMES NEW DIRECTOR OF DENTAL ACTIVITIES

Brigadier General Clarence P. Canby recently assumed his duties as director of dental activities at Walter Reed Army Medical Center, Washington, D. C.

This marks General Canby's fourth assignment at Walter Reed. In 1932, he began a five-month course at the Center's Dental School. From 1933 to 1936 and

again from 1939 to 1941 he served as chief of the school's dental bacteriology division.

General Canby has served on active military duty since 1927. Before assuming his present duties, he was chief of the dental service at Letterman Army Hospital, San Francisco. That assignment was preceded by a three-year tour as dental surgeon with the Armed Forces, Far East.

Brig. Gen. Clarence P. Canby

General

ALFRED C. YOUNG SUCCUMBS; A.C.D. PRESIDENT-ELECT

Alfred C. Young, who would have become president of the American College of Dentists on November 3 in Miami, died on October 15 at the age of 67.

Dr. Young, a graduate of the School of Dentistry of the University of Pittsburgh, was a member of the faculty of that school since his graduation. At the time of his death, he was professor of crown and bridge prosthodontics. During World War I, he served as a first lieutenant in the Army Dental Corps.

Active for many years in his local and state dental societies, Dr. Young served as president of the Pennsylvania State Dental Society in 1931. He also was a past president of the Omicron Upsilon honor society.

ORAL PATHOLOGY BOARD EXAM TO BE GIVEN IN DECEMBER

The next examination for the certification of diplomates of the American Board of Oral Pathology will be held December 7 and 8, announces Donald A. Kerr, secretary-treasurer. The place of examination will be selected later in the year. Candidates may write Dr. Kerr at the University of Michigan School of Dentistry, Ann Arbor, Mich.

DENTAL SOCIETY TO AID AGED WILL MEET IN MIAMI

A preorganization meeting of the American Society for the Advancement of Dentistry for the Aged will be held on Sunday, November 3 at 11 A.M. at the Seville Hotel, Miami. This is a new society, founded to expand and improve the dental services for the senior citizens. H. M. Friedman, 12730 W. McNichols Road, Detroit, will preside.

NEW DENTAL HOSPITAL PLANNED FOR LOS ANGELES

John W. Hay, president of the American Hospital Building Corp., has announced plans for the construction of a 1 million dollar structure to be located on Sunset Boulevard west of Vermont Ave. It is reported that this is the first major hospital designed exclusively for the use of dental patients in the Los Angeles area.

Construction of the three-story, 80-bed facility is expected to begin prior to the end of 1957. The hospital will include two-way communications to operating, recovery and private rooms. Private rooms for inpatients will feature enclosed patios, sliding glass doors, electronically controlled drapes and beds, and built-in television and radio systems with bedside controls.

GONADAL RADIATION INCIDENTAL TO DENTAL ROENTGENOLOGY APPEARS TO BE RELATIVELY INSIGNIFICANT

Dentists may be confronted by an occasional patient who is distraught because of columnist Drew Pearson's October 12 unscientific and carelessly worded warning entitled "X-ray Danger." They may wish to call attention to the following article reprinted from the October 5, 1957 issue of the *Journal of the American Medical Association*. The article is entitled "Radiation Exposure During Dental Examination." The terminology is relatively simple.

To the editor: Recently increasing concern has been shown regarding the hazards implied in the use of diagnostic as well as therapeutic x-rays. What is an opinion as to the x-ray dosage to which routine dental films expose the patient in the average office, and what significance, if any, is there to the repetition of these dosages at nearly every subsequent visit to the dentist (ordinarily recommended to be twice a year) over the average lifetime? Also, are there any figures as to the ratio, in these exposures, between the dose received by the head and neck and the dose received by the gonads in the two sexes? would the latter dose be considered significant from a genetic standpoint?

Alfred B. Mason, M.D., Concord, Calif.

Answer: The amount of radiation received by the patient during a routine dental roentgenographic examination depends on a number of factors. The type of equipment, the speed of the film, the technique employed, and, for certain considerations, the physical size of the patient determine the amount of radiation necessary to obtain a satisfactory roentgenogram. Depending on these variables, the radiation may vary from the high figure of 315 r per 70 seconds for full-mouth examination as cited by Nolan and Patterson (*Radiology* 61:625, 1953) to as low as 0.24 r per two-second exposure as reported by Yale and Goodman (*J. Am. Dent. A.* 54:354, 1957). A reduction to one-thirtieth of the unfiltered dose was attained by interposing 0.375 mm. of copper and 0.5 mm. of aluminum in the primary beam of the conventional dental x-ray machine without affecting the excellence of the roentgenograms. Such use of proper filtration and other means of dose reduction are rapidly becoming standard practice in dental radiography.

A conventional dental roentgenographic examination consists of 14 films. The exposure to the gonads of the patient who receives one such examination annually from age 10 to age 30 would be approximately 0.3 r for the male and about 0.05 r for the female. The natural background radiation to which everyone is exposed is about 4 to 5 r for a 30-year period. All radiation is significant from a genetic standpoint. The amount of gonadal radiation received incidental to dental radiography is but a fraction of the natural background radiation, however, and would appear to be relatively insignificant.

International Correspondence

NEWS FROM GREAT BRITAIN

The dental research subcommittee of the Dental Health committee is appealing to all dental practitioners in Great Britain to assist in collecting information on caries immunity by answering the following question.

"How many patients have you who fulfill the following conditions:

"Persons over 30 years of age having a full dentition of 28 teeth, excluding wisdom teeth, no restorations present, and no clinically detectable caries.

"Bitewing roentgenograms of the posterior teeth should be sent in support."

This is an interesting inquiry into caries immunity from an epidemiological point of view, and if there are indications that in certain areas considerable numbers fulfill the foregoing conditions, it is hoped that research workers may be persuaded to investigate the possible factors involved.

In an editorial in the *British Dental Journal* dealing with research in the dental surgery, comment is made on the above inquiry:

"It asks little of anyone, even the busiest, but the cooperation of the man-in-the-surgery might, in time, prove to be of the greatest value to mankind, and worth far more than the effort required to supply it. Observations by general medical practitioners have been of considerable help in the elucidation of the causes of disease, and it may well be that dental surgeons with keen clinical perception could make contributions which, collectively, would be of the greatest research value."

Canada • The visit of the chairman of council, Lionel Balding, and Mrs. Balding to the annual meeting of the Canadian Dental Association was a very great success and Don Gullett, secretary of the Canadian Dental Association, writes in a letter to the *British Dental Journal:*

"On behalf of the officials and members of the Canadian Dental Association, I feel it most fitting that appreciation of Mr. Balding's visit to our recent annual meeting be expressed. His contribution was an extraordinary one and served to give our members a considerable insight into the position of British dentistry at the present time."

Lionel Balding himself has said that the deepest impression which he and Mrs. Balding had received during the trip was given by the pleasure which had been shown at the fact that a representative from Britain attended.

He felt sure that both the Canadians and the Americans saw the likelihood of having socialized dentistry in the near future and were very concerned about it. They were anxious to hear of conditions in Britain so that they could, as far as possible, avoid the mistakes made here.

An address, "The Future Supply of Dentists," which Lionel Balding delivered at a special convocation of the University of Manitoba on June 25, after having had conferred on him a Doctorate of Law degree, is well worth reading in the August 4 edition of the *British Dental Journal.*

GENERAL DENTAL COUNCIL

The report of the finance committee presented by Fred Ballard, chairman, has been published. The assets as of December 3, 1956 stood at £128,088, and it is estimated that the gross income for 1957 will amount to £70,600 and that necessary expenditures will amount to £42,850. The difference of £27,750 will be available for (1) appropriation to reserves and (2) expenditures for dental education, research or any other public purposes connected with dental education, research or any other public purposes connected with the proferred on him a Doctorate of Law degree, is visions of the First Schedule to the Dentists' Act of 1956.

The members of the dental profession in the United Kingdom are interested in these figures as they relate to the necessity of maintaining the compulsory annual retention fee at £4.10.0d. ($12.60). This is in addition to the many voluntary subscriptions dentists may pay, such as £6.6.0d ($17.60) to the British Dental Association. There seems little prospect of a reduction in the annual retention fee because the finance committee in its conclusion states that if the annual retention fee is maintained at its present level—after meeting the cost of obligatory functions—the surplus available both for expenditure on capital projects and allocation to the purposes mentioned in the preceding paragraph must inevitably be reduced during the next few years.

The General Dental Council organized two exhibits on dental health education. The first, in August, was for a large boys' and girls' exhibition. The Council's display, based on one of its booklets, *A House in Toothtown*, was designed to give the impression of a house.

The second exhibit, in September, was the social dentistry exhibition at the XII International Dental Congress in Rome. The Council's aim was to present the work which it is doing in educating the public in dental health, and the exhibits therefore consisted of material which has been recently acquired, or is in general use, by the Council.

NATIONAL HEALTH SERVICE

Both the Houses have approved regulations for Ancillary Dental Workers' Regulations, to be made by the General Dental Council under the Dentists' Act. The text of these regulations is not yet publicly available, but it is understood that they authorize the employment, both in public service and in private practice, of dental hygienists who will be employed to scale and polish teeth, apply medication and give instruction in dental hygiene.

School Dental Service • In December, 1956, the school dental service in England and Wales was staffed by 947 dentists in full time service and 867 others were employed on a part-time basis.

ITEMS OF INTEREST

The new premises of the Department of Dental Medicine at Guy's Hospital Dental School were open to view in July. They cover about 2,000 square feet and consist of four small laboratories for teaching staff and research workers, an office-library with one dental chair for clinical studies, a large laboratory for technicians and other workers, a darkroom, and a display bench for demonstrations of pathologic conditions.

The many friends and colleagues of Professor Martin Rushton will wish to congratulate him on his new department.

It is interesting to note that Newton Health Technical College, Manchester, has started a dental surgery assistants' course which will prepare students for an examination by the British Dental Nurses and Assistants Society.

G. H. Leatherman,
D.M.D., F.D.S., R.C.S., F.A.C.D.

NEWS FROM ARGENTINA

The officials of the Facultad de Odontológia de Buenos Aires have established a set of regulations for entrance to a career in dentistry. All aspirants are required to attend both sessions of a preparatory course. The orientation session, which started September 1, will extend through December 15. The second session will be held from January 15 to March 31. Inability to attend these courses, for justifiable causes, makes it necessary for the applicant to submit to a special examination covering the courses presented.

XIII JORNADAS OF THE ASOCIACIÓN ODONTOLÓGICA ARGENTINA

The Jornadas was held October 14 to 17 in the headquarters of the Argentina Dental Association. An exhibition of public health material was displayed in the headquarters of the College of Dentistry, under the auspices of the Association. Participants in the program included 26 foreign clinicians, 13 representatives from Argentina and about 130 members of the Association.

CÍRCULO ODONTOLÓGICO DEL OESTE

Offices and the special libraries of the Círculo Odontológico del Oeste soon will be housed in their own headquarters, located at Avenida Directorio 1824. Felipe Mendez Diz, president, is working steadily to complete the installation. This organization publishes a magazine under the direction of Juan Carlos Pitassi.

PENSION FOR PROFESSIONALS

The dental profession of Argentina, together with other professional groups, has initiated a movement to modify the law recently adopted by the government. Among the points under discussion is the situation faced by a number of dentists who recently reached pension age or who will be eligible in 1959. For this group, the amount of pension would be substantially reduced in view of the payment which they have to make for the years during which this law was not in effect. The assessment is based, in general terms, on the monthly profit of each dentist. A system of social security would be preferred.

PUBLIC DENTAL HEALTH CONGRESS

A public dental health congress was held in Rosario in October. Those interested in obtaining a report on this meeting may write to the Departamento de Odontología, Juan de Garay 2880, Santa Fé, Argentina.

COOPERATIVA ODONTOLÓGICA DE PRÓTESIS DE BUENOS AIRES LIMITADA

The Cooperativa Odontológica de Próteais de Buenos Aires Limitada recently elected a new board of directors as follows: Horacio Mazariegos, president; Ricardo A. Carnevale, vicepresident; Henach Bijovsky, secretary; Francisco Cespa, treasurer, and José Porter, member of the board.

COLLEGE OF DENTISTRY OF BUENOS AIRES

The graduate department of the College of Dentistry will be in charge of organizing all graduate courses and of coordinating all activities relating to professional postgraduate work. Publication of scientific works and the promotion of interchange of ideas among similar organizations, both within Argentina as well as between Argentina and other countries, will be directed through this department.

Ricardo A. Crespi, Buenos Aires

NEWS FROM CHILE

Juan Colin, president of the Sociedad Odontológica de Chile, announces plans for an International Dental Congress to be held in Santiago in November, 1958. Professors and clinicians from American countries, France and Germany will be invited to participate in the Congress.

A new organization, the Dental University Club, recently was organized in Santiago. This group held a dinner in the Club de la Union in honor of Dr. and Mrs. Leonel Rosenthal and Alfonso Leng, former dental dean in Santiago. Dr. Leng, an outstanding musician, recently received the National Art Award.

Among the guests were Manuel E. More, newly appointed consul of Chile in Philadelphia; Victor Daniels, Raúl Covarrubias, Eduardo Ferraro, Ismael Carmona, Raúl Bhem, Raúl Riquelme and Gabriel Mardones.

The purpose of the club, organized by Raúl Muñoz Inza, is to maintain a good will program with other American organizations. A monthly program designed to strengthen international relations will be conducted by the organization.

Raúl Muñoz Inza

The Reader Comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editor reserves the right to edit all communications to fit available space and requires that all letters be signed. At the request of the author, signatures will be deleted before publication. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

DENTIST CHALLENGES MERITS OF VERTICAL BRUSHING

Vertical toothbrushing is awkward, slow and difficult, and thus people are discouraged from practicing it. Vertical brushing has been a failure. There is proof of this in almost every human mouth. Those who try to practice vertical brushing usually neglect the gingivae on the posterior buccal surfaces of maxillary molars and on the lower anterior lingual surfaces.

Vertical toothbrushing is an idea that was propounded long ago without sufficient research. Dentists have been advocating it, largely because a certain leader recommended it, not because sound and careful research has proved its superiority.

I advocate horizontal toothbrushing with brisk, jiggly movements, taking care to cleanse all of the gum lines and teeth in the mouth. Correct horizontal brushing is easy, fast and effective, and can save many millions of teeth from gingival disease for years or throughout life.

In my 41 years of dental practice I have seen no convincing proof that horizontal brushing sufficient for good cleaning causes the gingivae to recede any more than does vertical brushing. Any manner of overbrushing may cause some gum recession, but gum damage from brushing (either vertically or horizontally) never results in tooth loss.

Gingivae that are clean all the way from the lower anterior lingual surfaces to the upper posterior buccal surfaces are always brushed horizontally. Many people do not know that it is necessary to brush the gingivae. The dentist must tell his patients: "Brush your gum lines and your teeth."

My own gingivae are healthy after more than 60 years of vigorous horizontal brushing two or three times daily, with only slight recession. One of my patients, age 92, has brushed his teeth and gingivae back and forth twice daily since he was a small boy. The gingivae on his remaining 28 teeth are pink, firm and healthy, and have not receded more than 1 mm. anywhere.

The best toothbrush is one that is tufted and serrated, with rather soft bristles. Hard bristles scratch the gums and discourage correct gingival brushing.

I have taught self mouth hygiene as my dental hobby since 1915. I would be thrilled to read comments on home dental care by experts and specialists.

C. W. Garleb, Brooklyn, N. Y.

Cases and Comments

REMOVABLE BRIDGES WITHOUT SADDLES

By A. H. Tamarin, D.D.S., Chicago.

Since the introduction of acrylic resin material to the dental profession, the design of removable bridges has been considerably improved. The metallic saddle, which serves as a base of retention for porcelain teeth, can be eliminated.

In removable bridges, the lateral movement of the mandible is counteracted by the resistance of the metallic clasps which also prevent the bridge from becoming dislodged. The mesioocclusal and distoocclusal projections or "rests" keep the bridge from settling on the alveolar ridge, thereby preventing irritation of the gum tissue. But the stability of the bridge itself depends solely on the clasps.

In acrylic bridgework, a rod or channel wire can be passed through the center of the pontics to serve as an anchor. Thus, the metallic saddle becomes unnecessary and can be eliminated. Furthermore, the acrylic teeth directly contact the mandibular ridge, more closely simulating the appearance of the natural teeth and thereby improving the esthetic value of removable bridges.

The following technic is recommended:

Fig. 1 • A model of investment compound can be made after an alginate or colloidal impression of the teeth and surrounding area has been taken

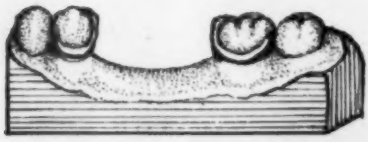


Fig. 2 • Models of the clasps then are designed and reproduced in inlay wax

Fig. 3 • The anchor for the pontics is fashioned by bending a wax wire into two parallel lines and, with the use of a wax spatula, uniting them at intervals of 2 mm.

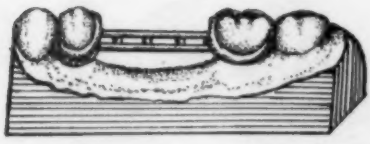


Fig. 4 • The wax rod then is cut to the proper length and united with the wax clasps at their proximal surfaces. Enough space is allowed between the alveolar ridge and the occlusal surface

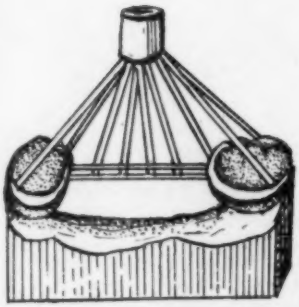


Fig. 5 • One common sprue is created by attaching the wax sprues to the wax bar and clasps. The model then is invested and cast

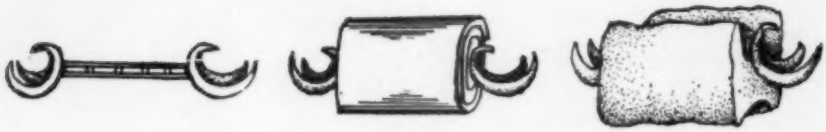


Fig. 6 • After the model has been cast (left), the metallic sprues are cut off and the clasps polished. The metallic rod is encircled (center) with a strip of baseplate wax. Then, while the wax on the rod is still soft, the metallic skeleton (right) is placed in the patient's mouth and the clasps are pressed into position. As the patient bites into the wax, an impression of the upper teeth in relation to the lower is produced

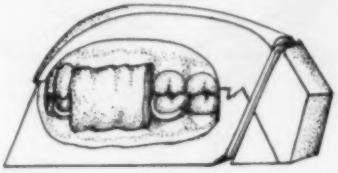


Fig. 7 • A plaster model of the upper teeth is produced from a colloidal impression. This model then is placed on the wax bite for articulation

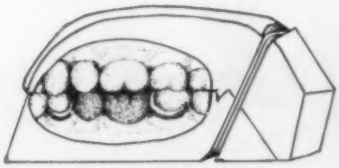


Fig. 8 • The teeth as carved from the wax bite

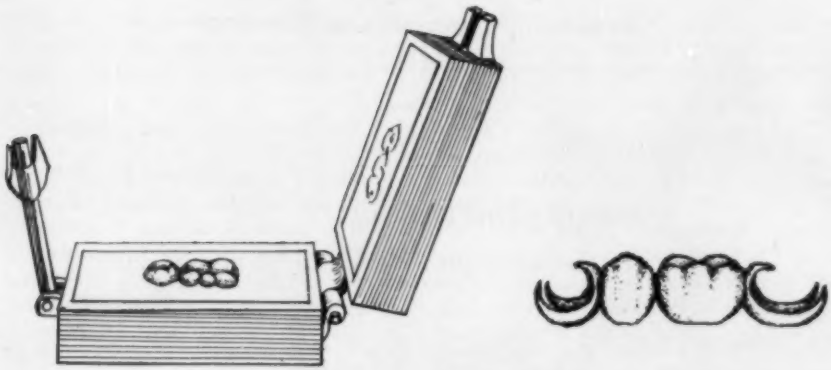


Fig. 9 • The teeth are invested into the flask (left) and processed. A sketch of the finished product is shown (right)

COMMENT

Appliances of this type have been in service for more than seven years.

25 East Washington Street

COUNCIL ON DENTAL HEALTH

Budget payment plans for the individual purchase of dental care: III

The success of a budget plan depends, in large measure, on intelligent use of the plan by the dentists. Most dental budget plans provide that the application for credit be completed in the dentist's office and that the entire transaction be handled without the patient having any personal dealings with the bank. In agreeing to such an arrangement, the bank places complete dependence on the dentist for presenting the budget plan to the patient and for evaluating the personal attitude of the patient regarding credit. In order that this presentation and evaluation may be made in the best interests of the patient and the plan, the dentist must have a good understanding of the operation of the plan and what effects his actions can have on its successful operation.

The plans which have shown the greatest development require that all dentists applying for enrollment receive a formal course of instruction in the general nature of the plan and on specific details of utilization, such as presentation to the patient, instructions to the patient, completion of the application and provision of credit information. Usually these courses are conducted by a group consisting of an officer of the dental society, a member of the governing body of the plan and a representative of the credit department of the bank. In the inception of the plan, the classes can be arranged for large groups, but periodic courses of instruction should be scheduled to accommodate new participants in the program.

In addition to the formal courses of instruction on the development of the plan, information on particular problems arising in its operation should be made available to members of the dental society through official publications of the society. All of the plans reviewed by the Council on Dental Health require a semiannual audit and report by the bank on the status of the plan. They also require the governing body of the plan to present to the membership of the society a report based on this semiannual audit. The governing body's report should consider all of the changes which have been made in the plan during the period covered by the report as well as information on how the members can make better use of the plan and how they can make it more effective in increasing the distribution of dental care. Such reports should be published and distributed to the entire membership.

One bank official has indicated that in plans operating in the vicinity of dental schools, courses for dental students on the value of budget plans might well be included in the student American Dental Association program. The bank with which he is associated makes a practice of providing speakers for meetings of dental assistants and dental hygienists on the

This article is the third in a series of four to be published in subsequent issues of The Journal.

basis that most of the procedures for using the plan in the dental office can be accomplished by the auxiliary personnel.

PERIODIC EVALUATION OF PLAN

The idea of establishing a loss reserve through voluntary contributions by the providers of services in order to afford the consumers with the security against which the costs of the services may be financed is relatively new. Even among those plans which have had the most successful experience, there has been no definite determination of what constitutes an adequate loss reserve, nor has its relation to the amount which is withheld from the dentist's fee (discount rate) to establish such reserve been determined. Banks and dental societies have found it necessary to revise the note forms repeatedly in order to improve the loss percentage.

Any new plan must be based on well-considered estimates and a willingness to experiment and to refine the details of the plan on the basis of experience. The initial requirements of banks for loss reserves vary between 15 per cent and 25 per cent of the credit outstanding. The original plans required a withholding of 5 per cent from the dentist's fee to establish an adequate loss reserve account. Some plans have reduced this withholding to 3 per cent, and there are indications that it will reach a satisfactory level at 2 per cent. Several societies indicate that the percentage of loss may be reduced by improvements in the criteria for granting credit to individuals and in the administrative details for effecting payments to the bank. The governing body of the plan must see that a maximum distribution of credit is granted under the plan, consistent with an acceptable percentage of loss charged to the loss reserve and with minimal administrative overhead to the bank.

There are few hard and fast rules applicable in the initial operation of budget payment plans. Such plans must be developed through constant evaluation of the experiences gained through actual operation of the plan. The judgment as to where the plan must be brought into balance between loss experience, loss reserve costs and maximum service to the public must be rendered by the governing body with the support of the opinion of the bank. One of the essential requirements of the governing body will be a semiannual report and accounting by the bank as to the activities of the budget plan. Examples of such audit reports are included.

In addition to the experience data which are obtained from the bank, the society should undertake a periodic survey of the number of dentists who use the plan in their practices and the number of patients in each practice who finance their dental bill through the plan. It is important, too, to know if patients are making repeated use of the plan. Provision should be made also for opinion studies of both patients and dentists on their reactions to the use of the plan. In most of the plans that have been surveyed, little or no information of this type has been collected.

PROMOTION OF PLAN TO DENTAL PROFESSION AND PUBLIC

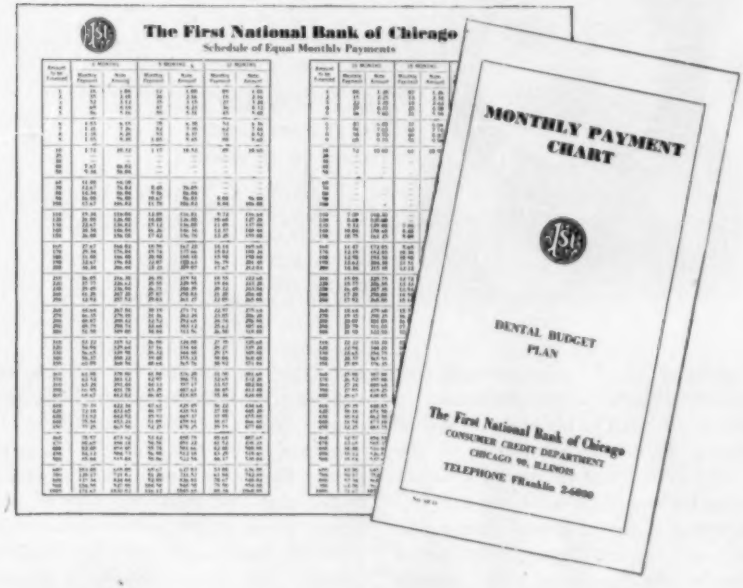
Methods used in the promotion of the plan to the public should be under the complete control of the dental society and should, of course, be in keeping with the *Principles of Ethics* of the American Dental Association and the code of ethics of the constituent or component dental society operating the plan. The initial promotion should be directed toward developing 100 per cent participation by the members of the dental society. The promotional material should be designed to interest the dentist in using the plan by describing the benefits which he will derive in more efficient operation of the business procedures of his practice and in improvement of his service to his patients.

Promotional materials for the public

■ FOLDERS WHICH THE DENTIST MAY GIVE TO HIS PATIENTS TO INFORM THEM OF THE AVAILABILITY OF THE PLAN

Here's why
THOUSANDS OF CALIFORNIANS USE
Timeplan
TO FINANCE DENTAL BILLS
There is no delay . . . any dental care you need is possible at once.
$6 A YEAR FOR EACH $100
The cost is low . . . with Timeplan you pay only $6 a year for each $100.
Convenient monthly payments . . . make them at any Bank of America branch, or pay by mail.
Timeplan budgeting will establish useful bank credit for you throughout California.
The transaction is entirely confidential . . . there's no embarrassment or red tape.
All arrangements may be made in your dentist's office.
Bank of America

■ MONTHLY PAYMENT CHART USED TO DETERMINE THE SIZE AND NUMBER OF THE MONTHLY PAYMENTS BEST SUITED TO THE PATIENT'S BUDGET


The First National Bank of Chicago
Schedule of Equal Monthly Payments
MONTHLY PAYMENT CHART
DENTAL BUDGET PLAN
The First National Bank of Chicago
CONSUMER CREDIT DEPARTMENT
CHICAGO 90, ILLINOIS
TELEPHONE FRanklin 2-6000

■ PLACARDS FOR DISPLAY IN OFFICES OF PARTICIPATING DENTISTS TO INFORM PATIENTS OF THE AVAILABILITY OF THE PLANS

■ DECAL WHICH MAY BE PLACED ON THE GLASS OF AN INNER DOOR OF THE DENTAL OFFICE TO INFORM PATIENTS OF THE AVAILABILITY OF THE PLAN

The material should also provide the dentist with information to assist him in presenting the plan to his patients and in developing their maximum use of the plan. The experience of dental societies operating budget plans indicates that full participation of dental society members in the plan and the intelligent promotion of the plan by the dentists to their patients will insure the success of the plan.

The key to the success of any plan for meeting the costs of dental care is the enthusiastic support of the dentists who must provide the care. Unless the plan has been successfully promoted to them, it will not gain broad acceptance. Promotion to the dentists is relatively simple and inexpensive and will put only a minimum financial burden on the plan in its initial phase.

The direct promotion of budget plans to the public through media regularly available to the public presents a great many problems which must be given thorough consideration by all the agencies involved before firm policy can be developed. For the present time and until budget payment plans show participation by a preponderance of the members of the dental society operating the plan, the use of direct promotion to the public should be discouraged. Such promotion will create a demand for services which may not be sufficiently available in the dental offices of the community. The pressures on dentists who are not participating may well arouse their resentment to the plan and make the task of stimulating their participation unnecessarily difficult. Such promotion is usually expensive and may provide a financial burden to the plan that may retard its growth and development.

MANAGEMENT OF LOSS RESERVE FUNDS

In the plans reviewed by the Council, there is a considerable variation in policy on the management of loss reserves. In most of the original agreements with the banks, the loss reserve requirements have been established at between 15 and 25 per cent of the outstanding credit with agreements that adjustments were to be made at six-month intervals as a result of loss experience. Loss reserve funds in the plans reviewed have been built up through a combination of the following sources:

1. Charge of registration fee to dentists applying for participation in the plan.

Audit reports

■ AUDIT REPORT COVERING 41 MONTHS' OPERATION OF A PLAN OPERATED BY A DENTAL SOCIETY THROUGH ONE BANK

THE FIRST NATIONAL BANK—FORT WORTH, TEXAS

Analysis of Fort Worth District Dental Society Dental Plan
covering 41 months of operation beginning
February 12, 1952, and ending July 22, 1955
(all figures cumulative)

	Jan. 1953	Jan. 1954	July 22, 1955
Dentists participating	98	118	134
Number loans made	849	2,040	4,697
Purchases	$177,836.45	$433,135.41	$1,000,186.77
Average note	209.46	212.32	212.94
Amount repaid on loans	64,366.75	282,850.71	746,846.38
Outstanding balance	113,469.70	150,284.70	253,340.39
Balance in reserve	7,481.43	13,068.40	*23,004.12
Reserve to outstanding	6.59%	8.7%	*9.08%
Number notes charged off	8	55	192
Amount charged off	1,137.92	7,309.72	22,397.04
Charged off recoveries	none	751.40	3,254.89
Net amount charged off	1,137.92	6,558.32	19,142.15
Percent of notes charged off to purchases	.6%	1.5%	1.91%
Average amount charged off on each note	142.24	119.24	116.65
Number accounts thirty days or more past due	9	29	37

*The reserve account has an additional $1,000.00 which was disbursed to the Dental Society in 1954. With this additional $1,000.00 the reserve percentage stands at 9.5% to the outstanding.

■ SIX MONTH AUDIT REPORT INCLUDING RECAPITULATION OF THE FIVE AND A HALF YEARS' EXPERIENCE OF THE PLAN OPERATED BY DENTAL SOCIETIES THROUGH A BANK WHICH HAS BRANCH BANKING

REPORT BY COMPONENT SOCIETIES ON CALIFORNIA STATE DENTAL ASSOCIATION POSTPAYMENT PLAN FOR DENTAL CARE SIX MONTH PERIOD 12-1-56 to 5-31-57

		FINANCED		OUTSTANDING			CHARGED TO RESERVES		DELINQUENCIES			
Society	No.	Amount	No. of accounts	Amount	No. of notes	Deposited in reserve	No.	Amount	Per cent loss	30-65 days	Over 65	%
San Francisco	1	$239,140.53	890	$306,422.84	1862	$4,539.51	23	$2,281.55	0.95	33	20	2.8
Santa Clara	2	103,595.87	434	132,147.23	916	1,911.53	15	2,115.62	2.04	13	14	2.9
Sacramento	3	189,243.36	793	234,414.77	1542	3,671.20	17	3,043.64	1.61	25	19	2.8
Alameda	4	280,629.78	986	373,344.97	2212	4,996.83	28	4,810.08	1.71	29	23	2.3
Fresno-Madera	5	95,603.88	341	125,688.68	686	1,784.07	6	1,273.82	1.33	7	3	1.4
Napa-Solano	6	52,258.75	201	67,997.60	438	950.58	7	816.24	1.56	8	7	3.4
San Joaquin	7	63,967.11	253	82,393.29	508	1,195.42	5	794.17	1.24	11	15	5.1
Sonoma	8	35,909.81	154	46,901.50	313	684.42	8	957.42	2.67	3	7	3.2
Santa Cruz-Monterey	9	61,367.12	231	84,109.65	558	1,150.42	8	1,320.89	2.15	11	1	2.1
Humboldt	10	41,886.72	177	55,135.57	390	850.71	9	922.45	2.20	8	7	3.8
Contra Costa	11	187,735.25	644	252,721.10	1525	3,444.02	20	4,017.37	2.14	23	11	2.2
No. California	12	79,978.20	298	99,335.06	632	1,560.39	10	1,519.96	1.90	3	1	0.6
Stanislaus	13	48,349.01	210	68,565.72	478	967.68	4	452.33	0.94	4	6	2.1
Tulare-Kings	14	54,262.89	238	69,791.50	515	1,027.21	7	974.15	1.80	7	6	2.5
Berkeley	15	24,788.33	96	32,651.75	210	466.54	1	65.91	0.27	4	1	2.4
Central Coast	16	23,765.71	99	34,939.28	253	477.53	2	277.36	1.17	4	3	2.8
San Mateo	17	109,057.69	412	140,820.32	877	2,029.58	6	786.19	0.22	14	11	2.8
Marin	18	23,989.43	91	31,353.92	156	454.94	6	946.46	3.95	9	4	8.3
Buttes-Sierra	19	49,197.95	215	57,339.95	395	968.36	12	1,723.34	3.50	7	3	2.5
Mid-Peninsula	20	62,933.01	196	80,913.43	406	1,177.52	6	963.30	1.53	4		1.0
Yosemite	21	23,637.77	99	33,571.16	153	444.87	1	317.52	1.34	6	3	5.9
Current period		$1,851,298.17	7058	$2,410,559.29	15025	$34,753.33	201	$30,379.77	1.64	233	165	2.6
Previous period		1,806,961.14	7027	2,306,027.07	14822	45,302.62	144	18,037.82	1.40	219	129	2.3
Total (since inception)		15,612,835.03	65416			585,077.57		220,674.74	1.41			

Balance in the Reserve Fund as of May 31, 1957 was $408,481.43. This allowed for all bad accounts charged back to date and includes recoveries for this semi-annual period totaling $4,500.36, plus interest on the Reserve Fund Time Certificate of Deposit amounting to $4,812.50.

Twenty-two accounts were paid through mortality insurance totaling $3,520.98. 2290 dentists are certified to participate.

Loss ratio for the 6 month period of 12-1-56 to 5-31-57 was 1.64%. Loss ratio for the entire 72½ month period of the plan's operation is 1.41%. Percentage of reserve to outstanding indebtedness as of 5-31-57 was 16.94%.

■ AUDIT REPORT COVERING SIX YEARS' OPERATION OF A PLAN OPERATED BY A DENTAL SOCIETY THROUGH A BANK WHICH HAS BRANCH BANKING

LOS ANGELES COUNTY DENTAL SOCIETY—NOVEMBER 30, 1956 THROUGH MAY 31, 1957

District	PURCHASES No.	PURCHASES Amount	OUTSTANDING No.	OUTSTANDING Amount	RESERVE COLLECTED	LOSSES No.	LOSSES Amount	LOSS % to $ Made	DELINQUENCY % by no. 30-65	DELINQUENCY % by no. Over 65	DELINQUENCY % by no. Over 30
Santa Monica and Beach towns	779	246,600.35	1739	312,201.42	9,122.05	37	7,847.02	3.2	16	9	1.4
Glendale-San Fernando Valley to Hollywood	1803	557,741.93	3865	716,007.88	20,489.76	74	12,991.68	2.3	42	13	1.4
Long Beach-San Pedro-Lomita to Bellflower	1675	467,833.31	3287	576,612.64	16,093.03	40	5,349.74	1.2	37	16	1.6
Pasadena-Whittier-Alhambra-Monrovia-El Monte	1063	306,466.25	2350	400,044.96	11,557.16	39	5,311.11	1.7	24	11	1.5
Beverly Hills	482	162,853.92	1174	224,099.46	6,372.83	28	5,685.87	3.5	22	11	2.8
Silverlake to Sunset 2000 Block	15	3,079.28	30	2,850.83	79.49	1	243.60	7.9	—	—	—
Hollywood	222	77,313.42	488	95,578.08	2,916.69	5	633.92	.8	9	2	2.3
Wilshire	296	92,128.85	689	122,440.13	3,338.38	7	1,222.69	1.3	12	5	2.5
Leimert Park	326	97,178.19	724	132,157.17	2,751.64	6	725.92	.7	7	3	1.4
Downtown Los Angeles	275	78,678.05	548	104,698.85	3,026.46	24	4,605.24	5.9	13	5	3.3
Eastside to Atlantic	156	41,453.02	397	58,345.04	1,682.39	4	395.02	1.0	6	1	1.8
Slauson to 106th-Figueroa to Crenshaw	239	70,264.90	574	95,317.02	2,678.15	10	1,543.75	2.2	6	1	1.2
Bell-Lynwood-Highland Park	756	203,653.34	1634	273,749.31	8,182.85	37	4,970.81	2.4	17	12	1.7
Total	8087	2,339,244.86	17499	3,114,102.79	88,290.88	312	51,526.37	2.1	211	89	1.7
Total to 11/30/56	70751	18,466,601.31			849,126.70	2269	348,310.85				
Total to 5/31/57	78838	20,865,846.17			937,417.58	3581	399,837.22				

LOS ANGELES COUNTY DENTAL SOCIETY

RECAP AS OF MAY 31, 1957

Total number of notes purchased since 10/3/50	$78,838.00
Total amount of notes purchased since 10/3/50	20,865,846.17
Average loan purchased since 10/3/50	264.67
Average loan purchased for period	296.68
Total number of participating branches	171
Total number of participating dentists	2,060
Delinquency percent in number over 30 days	1.7
Losses to date to loans liquidated	2.3
Losses to date to loans made since inception	1.9
Mortality claims paid during period (4)	1,166.60
Total reserve disbursed to Society as of 11/30/56	88,736.30

RESERVE RECAP

Total reserve collected for period		$88,290.88
Less—¼ or 25% of reserve collected to Society	22,072.72	
Balance of Reserve collected after disbursement		66,218.16
Balance of Reserve Acct. as of 11/30/56		412,079.55
Total		478,297.71
Less losses for period		51,526.37
Net balance of reserve account after disbursement		426,771.34
Percent of Reserve to outstanding after disbursement		13.7
Total amount charged to Reserve Acct. since 10/3/50		399,837.22
Total to date disbursed to Society		110,809.02

This item is not included in all of the plans reviewed. It varies from no charge for registration to a $10 registration fee.

2. Excess withheld from dentists' fees over losses experienced by the plan.

This discount charge is the most significant source of funds in building up the loss reserve. It is also the item most susceptible to adjustment and reduction, once the reserve is considered to be sufficiently large to protect the plan against the effects of economic recessions.

In the pilot phase of the plan, it is necessary to charge a discount rate in excess of actual or estimated loss experience in order that the loss reserve may be established as a bulwark against adverse economic recession or disaster. When, in the estimation of the bank, this fixed loss reserve is sufficient to guarantee the operation of the plan through such a period, the discount rate should be brought into balance with the normal operating loss experience of the plan.

3. Funds recovered by dental society on notes returned by bank after being charged off to loss reserve as delinquent and noncollectible under the agreed collection formula.

These uncollectible notes are, in fact, purchased by the dental society from the bank with the dental society's funds in the loss reserve. They are then processed through a collecting agency using normal collection procedures. Several plans call attention to the fact that no court action

LOS ANGELES COUNTY DENTAL SOCIETY—MAY 31, 1957

Period	PURCHASES No.	PURCHASES Amount	OUTSTANDING No.	OUTSTANDING Amount	RESERVE Collected	RESERVE Balance	RESERVE %	LOSSES No.	LOSSES Amount	LOSSES %	DELINQUENCY 30-65	DELINQUENCY Over 65	DELINQUENCY %
This period	8087	2,399,244.86	17499	3,114,102.79	88,290.88	426,771.34	13.7	312	51,526.37	2.1	211	89	1.7
Prior period	70751	18,466,601.31	16705	2,949,611.37	849,126.70	412,079.55	13.9	2269	348,310.85	1.8	230	73	1.8
From inception	78838	20,865,846.17	17499	3,114,102.79	937,417.58*	426,771.34	13.7	3581	399,837.22	1.9	211	89	1.7

Total number of branches participating
Total number of dentists participating
Average loan purchased for period
Average loan purchases since inception

LOSSES

To loans liquidated
To loans made

RESERVE RECAP

Balance Losses	426,771.34
	399,837.22
Rebate to date	826,608.56
To society	110,809.02
	937,417.58*

will be instituted until the statute of limitations for malpractice has run out and then only with the signed permission of the dentist involved.

4. Interest earned by stabilized loss reserve on deposit with the bank.

The loss reserve should eventually reach proportions which, in the judgment of the bank, will provide the plan with sufficient protection against economic recessions. The basic loss reserve should be stable under normal business conditions and should have the status of an interest-bearing deposit. The only need for the discount charge, then, is to meet the costs of notes which have been declared uncollectible by the bank. According to the experience of most plans now operating, the ultimate discount charge will be 2 per cent.

The withholding fee, or discount charge, was established initially at 5 per cent and has been adjusted according to experience. The amount withheld from the dentist's fee is deposited in the loss reserve and becomes the property of the dental society by agreement in the contract between the dentist and the bank. The primary purpose of the loss reserve is to furnish securtiy against which the bank can charge accounts that have become delinquent after a specified formula of collection has been followed unsuccessfully by the bank.

In some plans where the estimated ratio of loss reserve to outstanding credit was set at 25 per cent and the discount rate to the dentist was set at 5 per cent, experience has demonstrated that both were unnecessarily high and were producing a loss reserve in excess of the need to meet the losses due to contracts that were delinquent or unfulfilled for other reasons. From time to time, the banks have declared the loss reserve in excess of requirements, and the dental society has been faced with a need for policy on the disposition of the excess funds. Several of the decisions have been as follows:

Society A established a formula with

the assistance of the bank whereby all excess amounts for a given period were returned to the participating dentists in proportion to the degree of their participation.

Society B established a policy that "all moneys, if any, accruing from the plan be not used for anything but the reduction of the withholding portion from the dentist member." The objective in this instance was to reduce the discount rate to the absolute minimum required to meet the losses experienced after the reserve was large enough to provide satisfactory security against conceivable abnormal changes in the economic stability of the community.

Society C established a policy, by vote of the members participating in the plan, which continued the discount rate at 1 per cent above the adjusted discount rate required by the bank. The excesses created by this 1 per cent are credited to the dental society's education and research fund which is used to support a public service program of dental health education and the dental research program of the dental school in the area of the dental society. Subsequent excess funds in loss reserve have been used to reduce the discount rate which is now 3 per cent.

Society D places the receipts from excess reserve in its general fund. This fund is used for the operation of its over-all program.

Whatever policy is established for the disposition of excess loss reserve funds by the dental society, it should be based on sound legal and tax advice.

COUNCIL ON DENTAL RESEARCH

Supplement to list of certified dental materials

DELETION • The American Dental Association, Research Division, National Bureau of Standards, has been advised by the manufacturer of the product listed below that it is to be withdrawn from the market and, therefore, it should be eliminated from the List of Certified Dental Materials:

CERTIFIED DENTURE BASE RESINS (A.D.A. SPECIFICATION NO. 12)
TYPE 1—HEAT-CURING

Material	*Form*	*Manufacturer or distributor*
Lucitone	Pink; plastic cake	The L. D. Caulk Co.

BUREAU OF LIBRARY AND INDEXING SERVICE

Additions to the Library

The books listed here have been added recently to the Library collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing these books. Most of these books may be purchased through the Bureau. Practically all the dental journals published in the world are available also to members on loan.

BOOKS

AMERICAN CANCER SOCIETY. MASSACHUSETTS DIVISION. Cancer; a manual for practitioners. 3d ed. Boston, 1956. 321 p. $2.

AMERICAN DENTAL ASSOCIATION. 9th state secretaries' management conference, June 10-12, 1957. Chicago, 1957. 418 p. Mimeo.

AMERICAN DENTAL ASSOCIATION. BUREAU OF ECONOMIC RESEARCH AND STATISTICS. Distribution of dentists in the United States by state, region, district and county. Chicago, 1957. 62 p.

AMERICAN DENTAL ASSOCIATION. BUREAU OF ECONOMIC RESEARCH AND STATISTICS. Facts about states for the dentist seeking a location. Chicago, 1957. 34 p.

AMERICAN DENTAL ASSOCIATION. BUREAU OF PUBLIC INFORMATION. Publicity for dental societies. Chicago, 1957. 24 p.

ANDERSON, W. A. D. Synopsis of pathology. 4th ed. St. Louis, Mosby, 1957. 829 p. $8.75.

BUNTING, R. W., editor. Oral hygiene. 3d ed. Philadelphia, Lea & Febiger, 1957. 333 p. $7.

BURKET, L. W. Oral medicine; diagnosis and treatment. With a chapter on oral cancer by S. Gordon Castigliano. 3d ed. Philadelphia, Lippincott, 1957. 558 p. $14.

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DEUTSCHE GESELLSCHAFT FÜR KIEFERORTHOPÄDIE. Zahnärztliche Röntgenologie in diagnostischer and therapeutischer Anwendung; wissenschaftliche Tagung vom 6. bis 20. Mai 1954 in Bonn. (Zahn-, Mund- und Kieferheilkunde in Vorträgen, No. 16.) Munich, Hanser, 1955. 206 p.

DIETRICH, F. W. The history of dentistry in Arkansas; a story of progress. Camden, Arkansas, Hurley, 1957. 397 p. $10.

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GREAT BRITAIN. MINISTRY OF HEALTH. Code of practice for the protection of persons exposed to ionizing radiations. London, H. M. Stationery Off., 1957. 83 p. $1.44.

GYSEL, C. Fluor et stomatologie; essai d'une introduction encyclopédique a l'étude des rapports du fluor avec la science et la médecine dentaires. Louvain, Editions de la Revue Belge de Stomatologie, 1957. 238 p.

HARVOLD, EGIL. A roentgen study of the postnatal morphogenesis of the facial skeleton in cleft palate; a contribution to the orthodontic treatment of cleft palate. Oslo, Anatomical Institute, Univ. of Oslo, Department of Anthropology and Norwegian State Dental School, 1954. 102 p. $2.50.

HOLDSWORTH, W. G. Cleft lip and cleft palate. 2d ed. New York, Grune & Stratton, 1957. 187 p. $6.75.

IOWA STATE COLLEGE. VISUAL INSTRUCTION SERVICE. Catalog of audio-visual materials 1955-57. Ames, 1957. 142 p.

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The American Dental Association Film Library

Time and motion studies in industry have become topics for continuous research. Their application to dentistry, however, had not been studied until the Milwaukee Dental Research Club sponsored the project completed by David A. Hoffman, D.D.S., and Marvin Mundel, Ph.D., an industrial engineer and an expert in the field of time and motion study. In order to communicate the objectives and results of the project more effectively they produced the film, "Motion Study in the Dental Operatory," which will appear on the ninety-eighth annual session motion picture program at Miami, November 7, 1957. This film is now available for rental ($2.50) from the Film Library.

The producers, in their three years of study, have been searching for methods that would enable them to analyze the time spent in the dental office and the motion patterns used by the dentist while rendering dental service. To evaluate the time, they adapted a technic to dentistry called "random sampling." A questionnaire, prepared by the producers, and available free of charge from the Film Library, was sent out to many dentists. These questionnaires were then returned to the producers.

To evaluate motion, the producers adapted a technic called "memo-motion photography," developed by Dr. Mundel. The photographer using this technic takes motion pictures at one frame per second instead of the normal 16 frames per second for silent pictures. According to the authors, taking pictures at one frame per second enabled them to have a whole hour of dental activity on one 100 foot roll of motion picture film. This would not have been possible at the normal speed of 16 frames per second since one 100 foot roll would have had to be used every four minutes. Not only would this have been expensive but the sequence of the dental procedure to be photographed would have been lost during the reloading of the camera.

FILM REVIEW

Motion Study in the Dental Operatory • 16 mm., black and white, silent, 20 minutes. Produced in 1957 by David A. Hoffman, D.D.S., and Marvin Mundel, Ph.D., in cooperation with the Milwaukee Dental Research Club. Photography by the producers. Can be purchased ($45) from Dr. Hoffman, 4335 W. Fond du Lac Ave., Milwaukee 16, Wis.

This film shows five hours of dental activity in 20 minutes. Since the motion picture must be projected at silent speed or 16 frames per second, it will appear as if the operator is working 16 times faster than he actually did. "The idea is not to work fast but at a normal effective rate without fatigue and with greater efficiency and organization," according to the producers.

The producers have used the film to analyze the position of the dentist, position of the patient, the type and extent of movements and motion patterns of dentist and dental assistant, position of materials, tools, equipment and work areas and sequence of work. It is suggested that the viewer pay careful attention to these factors in the film.

The first part of the film shows the arrangement of the dental office three years ago at the beginning of the study. After the producers analyzed the points noted, many changes were made in the arrangement of the dental chair, position of the dental assistant, and location of instruments to increase the comfort of the patient and improve the efficiency of the dentist. These changes with the resulting changes in time and position are seen in the second part of the film.

This film, the first of its kind in time and motion study in the dental office, cannot be evaluated on its technical film quality. It was produced as an experiment, and as such will make an effective contribution to dentistry. The film may be of interest to the dental profession. For further reference on the subject, the reader may wish to consult the book, *Time and Motion Study,* written by Marvin E. Mundel, Ph.D., one of the film producers, available on free loan from the Bureau of Library and Indexing Service, American Dental Association, 222 E. Superior St., Chicago.

Book Reviews

REPORT OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL UNITS AND MEASUREMENTS (ICRU). HANDBOOK 62

U.S. Department of Commerce, National Bureau of Standards. 48 pages with 30 figures and 10 tables. $0.40. Washington 25, D.C., Superintendent of Documents, April, 1957.

". . . in the future tissue doses [of radiation] will be expressed only in terms of energy locally absorbed, that is in rads. This will avoid considerable confusion. For the purposes of the present report it is necessary to speak of tissue doses in roentgens for historical reasons and particularly in order to provide a basis for the transition to permissible absorbed doses in rads [roentgens absorbed dose: rad] . . ." is the statement of the *National Bureau of Standards Handbook 59*, page 7, on "Permissible Dose from External Sources of Ionizing Radiation" (1954).

Such a transition is the only way out of the confusion in the literature on dental roentgen hazards in which one report notes that patients receive up to 300 r while having roentgenograms made of all their teeth; another states they receive 5 r while having a roentgenogram made of one tooth; whereas another reports that they received 0.24 r while having a roentgenogram made of one tooth. This disturbingly uncertain situation results from the use of the roentgen as a unit of patient dose. The roentgen measures the amount of energy absorbed by a unit volume of air at the end of the x-ray cone, not the amount of energy absorbed by the patient.

The report of the International Commission on Radiological Units and Measurements presented in *Handbook 62* is a step in the transition from measurement in roentgens to measurement in rads. It defines the rad and the integral dose absorbed in terms which can be applied to a patient when it is desired to determine the radiation absorbed in a particular spot, for instance, in a tumor. Data are given primarily for higher energy roentgens, essentially above 250 kilovolts, and for gamma rays.

Handbook 62 is a definite step toward inducing those using radiation to express patient dosage in terms which are more directly related to the biological effect on tissue. The *Handbook* assembles for the first time much essential data for calculating the absorbed dose. The data included are not sufficient, however, for determining the radiation absorbed while taking a dental roentgenogram. This is a complex problem because of the heterogeneous nature of the medium (bone, teeth, muscle, air and metal) through which the roentgen rays pass in the patient. This difficulty is not as great when calculating the integral dose in a tumor, even though it may be situated in soft tissue alongside bone and thus be subjected to corrections because of the increase in secondary electrons at the bone-tissue boundary. Further investigation is required before the amount of radiation energy absorbed during dental roentgenographic examinations is known.

W. W. Wainwright

ORAL AND FACIAL CANCER

By Bernard G. Sarnat, M.D., F.A.C.S., and Isaac Schour, D.D.S., Ph.D., Sc.D. Second edition, 297 pages with 122 illustrations. Index. $8.50. Chicago, Year Book Publishers, Inc., 1957.

Intended primarily for the student seeking fundamentals rather than for the practitioner searching for advanced information, the 40 chapters of this book offer the reader a concise introduction to the subject of oral and facial cancer. The text is written in an unusually easy to read style and is arranged in logical sequence, emphasizing the important aspects of diagnosis. Essential points are clearly depicted by representative, graphic black and white and color photographs and by beautifully prepared, readily interpreted, sharp drawings.

The material is presented under three basic headings: the cancer problem, treatment, and diagnosis. Part two, "Diagnosis of Oral and Facial Cancer," is subdivided under the headings "Role of the Family Dentist and Physician in Cancer Control," "Carcinoma of the Soft Tissues" and "Cancer of the Jaws." In general, the material presented is brief and devoid of detail, surveying the subject at its most superficial level.

The first 13 chapters deal with general considerations of cancer with respect to public health, research, essentials of history taking, regional anatomy, methods of examining the orofacial structure, signs and symptoms of cancer, technics of diagnosis and differential diagnosis and an outline of procedure for

handling the patient after the diagnosis is established. Each of the succeeding nine chapters separately describes carcinoma of a particular region of the mouth, such as the lips, buccal mucosa, floor of the mouth or the tongue. This regional description of carcinoma is limited to the essentials of the anatomic and physiologic considerations and succinct considerations of the clinical aspects of the disease in that particular region.

One chapter, covering anatomy and physiology of the jaws, is particularly interesting for its description of bone physiology in the presence of tumors. This is followed by reviews of primary and secondary cancer of the jaws. The five chapters covering treatment cursorily mention aspects of surgery, radiation and plastic and prosthetic reconstruction. An appendix recapitulates, in outline form, the material covered.

It must be reiterated that the authors obviously intended the book to provide the student and uninformed practitioner with a comprehensive but superficial understanding of the subject. In this regard it fulfills its objective exceedingly well. An appended selected bibliography furnishes a source for detailed discussions.

Herbert J. Bloom

INTERVIEWING, COUNSELING AND MANAGING DENTAL PATIENTS

By S. Joseph Bregstein, D.D.S. 310 pages. Index. $7.50. Englewood Cliffs, N. J., Prentice-Hall, Inc., 1957.

A vast amount of useful information concerning the dentist-patient relationship has been put into this volume. The book, in a sense, is a consolidation of the author's extensive experience and a summary of his case material. Doctor Bregstein deals expertly with the psychological management of patients in the dental office. He tells the reader what to say, when to say it and how to say it to patients in order to gain their good will and cooperation.

The text is divided into ten sections: I, The Development of Patient Rapport; II, The First Interview; III, The Second Interview; IV, Completing Your Presentation—The Close; V, The Patient and Fees; VI, Your Patients and How to Retain Them; VII, Dealing with Juvenile Patients; VIII, Letters that Improve Dentist-Patient Relationships; IX, Dental Psychiatry—How to Apply it Successfully, and X, Hypnosis in Dentistry. Each section is subdivided into chapters.

The volume is written in a clear and concise manner, is well organized and reads like a novel. Although not dogmatic, the author does give guidance and advice. His principal interest is that the dentist shall express himself in a manner that is pleasing to the patient and capable of being understood by him. The book should prove of value to both dental practitioner and student. Both the author and publishers are to be congratulated on the excellent handling of such a vital subject.

E. Alan Lieban

THE RIDDLE OF STUTTERING

By C. S. Bluemel, M.D. 142 pages with 9 illustrations. Index. $3.50. Danville, Ill., Interstate Printers and Publishers, Inc., 1957.

The author, who looks upon stuttering as a disorganization of the person, presents some practical and thought-provoking material on the differences between organized and unorganized personalities.

Stuttering rarely begins in adult life, he states, because the speech pattern is well established by then. Consequently, the book is concerned more with childhood conditions and probably is of more interest to the dentist who works with children.

The chapter, "Principles of Therapy," is well written and the reader does not have to be a speech therapist in order to understand it.

Howard E. Kessler

A HANDBOOK OF SPEECH PATHOLOGY

Edited by Lee Edward Travis, Ph.D. 1,088 pages with 292 illustrations and tables. Index. $12. New York, Appleton-Century-Crofts, Inc., 1957.

This book is the work of 27 contributing authors, all recognized authorities in their fields. Despite the diversity of the sources of information, the organization is good. There are 33 chapters grouped under four major headings: "The Basic Considerations in Speech Pathology"; "Speech and Voice Disorders Associated with Organic Abnormalities"; "Speech and Voice Disorders Unrelated to Organic Abnormalities" and "Psychotherapy and Speech Therapy." The material is up-to-date and, for the most part, is presented in an interesting manner. Because of its broad scope and relative completeness, the book is an excellent reference source for speech students and therapists.

Of particular interest to the dentist are the chapters on pathomorphology of cleft palate and cleft lip, by Koepp-Baker; speech problems

of the person with cleft palate and cleft lip, by the same author, and the chapter by Bloomer on speech defects associated with dental abnormalities and malocclusions. The cleft palate discussions emphasize the newer group approach and the interdependence of all concerned in the habilitation of the cleft palate individual. The discussion of the role of malocclusions in speech pathology is less complete and does not incorporate some of the newer orthodontic concepts latest research.

The strong emphasis on psychotherapy in Part Four of the book reflects the author's conviction of the great importance of this aspect in coping with speech and voice disorders, whether there is an organic background or not.

The quality of paper is satisfactory, printing style quite readable and the binding excellent. The book should be invaluable for dentists interested in children with cleft palate and cerebral palsy, and for orthodontists concerned with the frequent speech problems of their patients.

T. M. Graber

RAUBER-KOPSCH: LEHRBUCH UND ATLAS DER ANATOMIE DES MENSCHEN (TEXTBOOK AND ATLAS OF HUMAN ANATOMY) BAND I—ALLGEMEINES, SKELETSYSTEM, MUSKELSYSTEM, GEFÄSSYSTEM (VOLUME I—GENERAL, SKELETAL, MUSCULAR AND VASCULAR SYSTEMS) BAND II—EINGEWEIDE, NERVENSYSTEM, SINNESORGANE (VOLUME II—VISCERA, NERVOUS SYSTEM AND SENSE ORGANS)

By Fr. Kopsch. 19th edition. Vol. I, 736 pages with 731 illustrations, some in color. Index. Vol. II, 768 pages with 782 illustrations, some in color. Index. Price per volume, DM. 64.50. Stuttgart, Georg Thieme, 1955.

This work represents a combined anatomical atlas and textbook. Morphology is stressed, with frequent consideration of functional aspects, particularly with regard to joints and muscles. Through some reduction in text, elimination of short developmental sections and incorporation of illustrations with the text, the older, multivolume editions have been condensed into a more convenient two-volume form.

Volume I begins with a general introduction which covers cytology, histology, the body as a whole, sexual and constitutional variations and the basic planes and axes of the body. The gross anatomy is presented by systems; these are the skeletal, muscular and vascular (including lymphatics). In each section, after a general discussion, the system is considered on a regional basis.

Volume II is composed of the viscera, nervous system, sense organs and the integument. The section on the oral cavity is at least as complete as those in American textbooks on anatomy, but is superior to most with respect to the quality and number of illustrations. The alimentary canal, its glands and accessory organs and the urogenital system are well-illustrated both grossly and at the microscopic level. Reproductions of microscopic sections in full color are particularly beautiful.

One of the more comprehensive and outstanding sections is that on the nervous system which totals 287 pages and contains 239 illustrations. Figures purporting to show the finer structure of the lung are outdated and the discussion of the pelvic fascias requires considerable revision, but on the whole this volume is very well done.

Those who are familiar with some of the earlier editions of Rauber-Kopsch will be particularly delighted by the considerable improvement in the clarity and beauty of the illustrations and by the fine quality of the paper and binding. Although some of the illustrations are borrowed from other sources, the majority are the work of the well-known German illustrators, Fr. Frohse and L. Krause, from preparations by Fr. Kopsch. Illustrations of the skeleton include a number of excellent roentgenograms.

The clear, uncomplicated style of the descriptive writing should not prove troublesome to one who has had a year or more of college German. Also, text and illustrations are intimately related and the latter are labeled, for the most part, in familiar Latin terms.

Students, physicians and dentists should find this work helpful, especially when used in conjunction with their English-language texts and atlases, and should regard it as a valuable addition to their anatomical libraries.

Vernon E. Krahl

Current Literature

INFECTIONS THAT COMPLICATE CANCER

Cancer Bul. 8:108 Nov.-Dec. 1956.

Common infectious processes as well as unusual patterns of infection often complicate neoplastic disease. Erosion of natural protective barriers by neoplastic tissues may permit invasion by microorganisms. Necrotic regions, whether in tumors with inadequate blood supply or in regions which have been devitalized by irradiation, may be the source of bacterial proliferation. Some of the agents used in cancer therapy may influence adversely those host factors which constitute "resistance." Thus, the detection and control of infections are important in the management of cancer patients.

Infection of a cancerous lesion reduces the chance of cure. For example, infection in cancerous tissue is one of the well-established contraindications to radiation therapy. Irradiation sensitivity of cancerous lesions is diminished in the presence of infection, and the surrounding inflamed tissues are increased in radiation sensitivity. Thus, the irradiation sensitivity of cancerous and healthy environmental tissue become relatively equalized. Necrosis may occur from irradiation in such instances as sclerosing ulcer or infiltrating carcinoma of the tongue. This frequently occurs in recurrent cancer after heavy irradiation.

When the resistance of oral tissue is lowered, as in instances of oral cancer, organisms may invade the tissue and produce secondary infections. Trauma may facilitate development of infection, as does moisture and warmth. Several effective procedures may be used to reduce mouth infection. The mouth should be kept as clean as possible by proper oral hygiene.This requires cleansing of the teeth and mucous membranes with cotton applicators, soft toothbrushes, hydrogen peroxide, warm normal saline solution and irrigations.

Activated medicinal zinc peroxide is the best oxygenic product yet devised for local care of wounds in the oral cavity. Penicillin has been an agent of choice over a number of years. Other antibiotics are employed when patients are known to have an allergy to penicillin, when oral therapy is desirable, and when the infection is known to be more amenable to another drug. When sulfonamides are used, they should be administered systemically, not locally. Also, antibiotics should be used as supplementary treatment and not as a substitute for such proper surgical treatment as incision and drainage of abscesses.

The patient must be taught the various technics relevant to his condition. This is necessary to control odors, prevent reinfection and promote healing by self-care.

MEDICAL-DENTAL RELATIONSHIP TO THE CHILD PATIENT

C. Everett Koop. J. Den. Children 22:197 Fourth quarter 1956.

A child is not a small adult and when he is treated as such, his response to surgery does not come up to expectations. The child differs from the adult in the character and variety of lesions presented for care and correction. His physiologic response to trauma, blood loss and so forth is different from the adult response to the same insult. If these differences are real for the normal child, they are much more so for the handicapped child.

A hospital experience for elective dental surgery in a handicapped child need not be an unpleasant one for a child. The child who enters a hospital properly prepared for that which he will encounter is almost invariably a happy one. The child who has not been told what to expect or who has been told a falsehood concerning his admission is suspicious of his parents, the doctors and nurses. It is almost impossible in a short hospital stay to win the confidence of such a child. The child should be told the truth about those things which will happen to him, although it is usually not necessary to go into great detail.

When a child is approached in honesty, his confidence is gained and his cooperation becomes a matter of course. For example, if a painful procedure, such as a needle puncture for a blood specimen, must be performed, it is wrong to tell a child: "This will not hurt." Rather, he should be told something like this: "We have to do a test on your blood and must take the blood from your arm with this needle. It will hurt, but just for a minute. As soon as it is over, you will realize that many things that happened to you yesterday hurt much more than that, and you never even cried." Usually, when some completely painless procedure must then be undertaken, such as a roentgenogram, the child can be

told, "This will not hurt," and the child will believe the practitioner.

Parents should begin several days in advance to prepare the child to come into the hospital. He should be told something of the duration of his stay, and whether he will be staying with his mother or with other children. Promises should not be made which cannot be kept by the hospital staff.

Fear of hospitalization is largely fear of the unknown or the unexpected. One of the best ways to overcome apprehension on the part of the family is to discuss with the parents exactly what they may expect so that they in turn can inform the child. The child depends on his parents for support in meeting any new situation, and they can be of great service to him and to the dentist by lending him the confidence which they have learned by facing the new situation squarely as it is presented to them by the dentist.

The postanesthetic recovery time is one of confusion for the child. Unlike adults, children rarely have prolonged nausea postoperatively and if they do not expect nausea, they frequently do not experience it. A child who has been properly instructed regarding the operation itself accepts the postoperative care without hesitation.

DENTAL CARIES CONTROL LABORATORY

W. J. Carter. J. Kansas City Dist. D. Soc. 33:17 Jan. 1957.

The laboratory services for the treatment of active and rampant dental caries are now available at the department of pedodontics, School of Dentistry, University of Kansas City. The bacteriologic laboratory procedures which include Snyder's colorimetric test and a lactobacillus plate count can be acquired through requests by dentists.

The Snyder test may be used as a screening test for all dental patients, but is too insensitive for use in following the progress of patients on a caries inhibitory diet. For the latter purpose the Rogosa lactobacillus plate count is offered. Since considerable evidence shows that the lactobacilus count is closely associated with the progression of dental caries, this test provides a more concrete analysis of the effects of therapy.

The department also offers a low carbohydrate dietary plan as both a therapeutic and preventive procedure for selected patients. The diets are based on the theory that oral lactobacilli can be reduced 75 per cent through a diet low in refined sugars and total carbohydrate. The diets are indicated for patients with lactobacilli counts of 10,000 colonies per milliliter of saliva or higher.

Requests for laboratory services may be sent in or telephoned to the author at the pedodontic department. A sterile tube with wax and instructions will be sent to the dentist concerned.

OSTEOTOMY OF CONDYLAR NECK FOR CORRECTION OF PROGNATHISM: STUDY OF FIFTY-TWO CASES

Daniel Verne; Richard Polachek, and Donald N. Shapiro. J. Oral Surg. 15:183 July 1957.

A procedure for correction of mandibular prognathism was evaluated by studying 52 instances of osteotomy of the mandible.

The ramus in this type of correction was sectioned along a line extending from the most inferior curvature of the sigmoid notch to a point superior to the angle of the mandible.

Orthodontic consultation was solicited and arch bars and bands fitted to the teeth preoperatively. Under general anesthesia, an initial incision was made at the posterior border of the ramus. An aneurysm needle was introduced which passed medially to the neck of the condyloid process and escaped from the skin at the sigmoid notch through a second incision. The bone was divided bilaterally by a Gigli saw. Intermaxillary fixation was maintained for six to eight weeks.

Complications during surgery were not serious. There was facial nerve involvement in seven patients, but this complication was not permanent in nature. Patients were contacted for direct examination postoperatively.

Bilateral osteotomy was performed on dogs to determine by actual visualization the union that occurs in the procedure in which cortex opposes cortex of bone. In each instance union occurring at the overriding surfaces was well calcified and firmly resistant to stress.

The method described provides an effective uncomplicated and relatively atraumatic procedure for correcting the protrusive mandible.

CLINICAL EVALUATION OF CHLORPROMAZINE IN GENERAL ANESTHESIA FOR MINOR ORAL SURGERY

Odus L. Baldridge. J. Oral Surg. 15:199 July 1957.

Some of the many properties ascribed to chlorpromazine are: (1) it produces sedation without respiratory depression; (2) it alleviates

nausea and vomiting; (3) it potentiates the effects of anesthetics, hypnotics and narcotics, (4) and it creates tranquility in a patient preoperatively.

It is apparent that some of these attributes of chlorpromazine could be useful in the management of patients during anesthesia for oral surgical procedures provided such other of its effects as hypotension and vasopressor blockade would not be seriously contraindicated. The discussions set forth in this paper are based primarily on clinical experiences with 155 instances of minor oral surgery. All the surgical procedures were performed under general anesthesia and only chlorpromazine and atropine or scopolamine were used as a premedication.

The results were subjected to a statistical significance evaluation and compared with those of a control group.

USE OF FREEZE-DRIED HOMOGENOUS BONE GRAFTS IN THE SURGICAL POSITIONING OF TEETH

Philip J. Boyne. J. Oral Surg. 15:231 July 1957.

This study reports the clinically successful surgical positioning of fully matured unerupted teeth in adult patients in which banked freeze-dried homogenous bone grafts were utilized.

A modified form of tooth transplantation which has been employed in the past to bring unerupted or impacted teeth of children into functional alignment in a one-step surgical procedure was used. This procedure was applied to adult patients in transplanting fully-formed maxillary cuspid teeth from their impacted unerupted position to their proper place in the dental arch. A new alveolar socket was prepared in the bone to receive the repositioned tooth and, as the tooth was transplanted into its proper position, the freeze-dried homogenous bone particles were placed between the root of the tooth and the bony alveolus. The mucoperiosteum was closed over the bone graft and, in some instances, temporary splints were used to stabilize the repositioned tooth during the first postoperative month.

The postoperative course was uneventful in all instances, and the transplanted teeth became firm and immobile two months after surgery. Roentgenographic examination revealed an early tendency toward uniformity of bone density surrounding the tooth, and nearly complete uniformity of osseous structure was demonstrated by the end of the fifth month. There was no evidence of root resorption and the periodontal tissues were clinically normal.

Although limitations in the number of patients operated on, and in the length of the follow-up periods (ranging from 4 to 12 months) would preclude the establishing of a definite prognosis as to the long term status of these transplanted teeth, this initial clinical success indicates that banked freeze-dried osseous tissue may have a definite application to tooth transplantation or surgical positioning procedures in adult patients.

SURGICAL CORRECTION OF BILATERAL ANKYLOSIS OF THE TEMPOROMANDIBULAR JOINTS

Raymond F. Huebsch, and William R. Staples. J. Oral Surg. 15:239 July 1957.

In traumatic injuries to the jaws and their supporting structures of children under 12 years of age, the most important factors in management are the time of initial treatment, the healing time, and the physiologic alterations of growth patterns.

Injuries near growth centers, as in trauma to the condyles, are followed by immediate reaction of the bone to the injury and onset of local reparative processes, as well as normal growth of the condyles. Unless early reduction and immobilization with early restoration of controlled function are instituted, discrepancies of occlusion and function with potential joint ankylosis may result. Under the same circumstances, the possibility of deformity is much greater in the child than it would be in the adult.

An 11 year old girl had sustained bilateral subcondylar fractures of the mandible, along with multiple injuries at the age of eight. The subcondylar fractures had been left untreated and ankylosis of both temporomandibular joints had resulted. To add to the difficulties of management, the patient was mentally retarded and was practically aphasic.

Bilateral osteotomies had been performed in simultaneous operations without success two years prior to our seeing the patient.

In order to prevent a bony union at the ostectomy sites, two similar procedures spaced six weeks apart were decided on as the procedure of choice. Through a Risdon type incision the ramus on the right was sectioned just superior to the lingula, the inferior portion was rounded and the bone superior was removed in the form of a concavity to a distance of approximately 1 cm.

At the sixth week interval, the left side was

operated on by sectioning the neck of the condyloid process and providing approximately 3.5 mm. of space. The coronoid process was exposed and its height reduced. Mouth opening of nearly 2 cm. was obtained almost immediately. On the eighth postoperative day the oral opening was 2.5 cm. Two and one-half months postoperatively, the occlusion was normal and the patient was comfortable and was eating a regular diet.

GINGIVAL CYST: REPORT OF CASE

David J. Kennedy. J. Oral Surg. 15:250 July 1957.

Few gingival cysts have been reported. Ritchey and Orban have described six instances of gingival cysts and Bhaskar and Laskin have reported three clinically and roentgenographically discernible lesions in the attached gingiva.

Ritchey and Orban listed the following etiologic possibilities for gingival cyst formation but seem to believe that no. four is the most likely.

1. Heterotopic gland tissue.
2. Remnants of the dental lamina, enamel organ or epithelial islands of the periodontal membrane.
3. Degenerative changes in a proliferation from an epithelial peg.
4. Traumatic implantations of displaced oral epithelium.

Where bone loss is noted in roentgenograms of suspected gingival cysts, it is wise to rule out first the more probable possibilities of periapical or periodontal pathologic conditions, mental foramens, and median cysts.

Gingival cysts that exhibit clinical signs are rare. Some may be overlooked because of lack of symptoms or be mistaken for an alveolar abscess.

A 30 year old white man was referred for diagnosis of a mass in the gingiva on the left side of the maxilla. The mass was removed and examined microscopically. It was reported to be an "epithelial inclusion cyst of the gingiva."

SINUSOIDAL ANEURYSM OF THE MANDIBLE: REPORT OF CASE

Sanford M. Moose. J. Oral Surg. 15:245 July 1957.

It is necessary at times to undertake what may appear to be a radical procedure to save a life. A boy, aged 13, whose only primary symptom was spontaneous gingival interproximal bleeding, was operated on after an overwhelming hemorrhage had occurred when an attempt had been made to obtain a specimen for biopsy. Hemorrhage occurred again even after ligation of the external carotid artery.

The final treatment necessitated a resection of that portion of the mandible which revealed a large radiolucent area and contained a sinusoidal aneurysm.

ASPIRATION BEFORE INJECTION OF DENTAL LOCAL ANESTHETICS

S. C. Harris. J. Oral Surg. 15:299 Oct. 1957.

The hazards of inadvertent intravascular injection of dental local anesthetic solutions are in proportion to the concentration in the blood which, in turn, is determined by the rate of injection versus the rate of destruction or elimination, or both.

The maximal safe rate of injection of procaine, when deliberately given intravenously for medical purposes, is said to be 16.66 mg. per minute. Injection of 1 cc. of 2 per cent procaine in one minute is at the rate of 20 mg. per minute. Most authorities would estimate that as the rate of administration increases arithmetically, the toxicity increases geometrically.

The untoward reactions may range from minor palpitations, through syncope, with or without convulsions to respiratory arrest, vasomotor collapse and death. Records indicate that fatal consequences occur very infrequently (one per 25,000,000 injections). It would seem that some of the untoward reactions can be avoided if positive efforts to prevent intravascular injection are taken.

The frequency of penetration of the vascular tree is estimated by records kept in the Northwestern University Dental School clinics for 8,534 injections. It was found that the incidence of aspiration of blood into the syringe was 2.02 per cent during infiltration, 3.60 per cent for mandibular injections, 4.35 per cent when zygomatic injection was attempted and 3.69 per cent for other types of injection. The over-all incidence was 271 cases or 3.18 per cent.

It was found that the only way of being certain that the needle point was in a blood vessel was to use a syringe which permitted aspiration to be practiced. Safety can be further insured if injections are always made slowly, without excessive pressure.

Deaths

Aegle, James S., Mount Pleasant, Tenn.; Meharry Medical College School of Dentistry, Nashville, 1913; died May 6; age 68.

Allen, Virgil G., Rugby, N. D.; North Pacific College of Oregon School of Dentistry, 1927; died December 3, 1956; age 58.

Alvord, William Roy, Detroit; died June 23; age 85.

Amick, Fred V., Doniphan, Neb.; Creighton University College of Dentistry, Omaha, 1925; died June 26; age 55.

Andrews, Charles T., New York; New York College of Dentistry, 1923; died March 30; age 66.

Aufderheide, Paul J., Cleveland; Western Reserve University School of Dentistry, Cleveland, 1912; died July 4; age 65.

Babbitt, George M., Redding, Conn.; Northwestern University Dental School, 1914; died July 2; age 65.

Baker, Claudius G., Nichols, S. C.; Baltimore Medical College Dental Department, 1909; died June 23; age 70.

Ballou, Edgar S., Montclair, N. J.; Howard University College of Dentistry, Washington, D. C., 1912; died June 1; age 67.

Barca, Joseph F., La Jolla, Calif.; College of Physicians and Surgeons, San Francisco, 1937; died June 30; age 45.

Barclay, Lacy H., Orange, Texas; Texas Dental College, Houston, 1942; died June 12; age 49.

Beeman, Clarence E., Cedar Rapids, Iowa; University of Iowa, College of Dentistry, 1903; died June 12; age 79.

Benson, Nelson B., Milton, N. D.; University of Minnesota School of Dentistry, 1915; died June 12; age 63.

Betts, Joseph S., Greensboro, N. C.; Vanderbilt University School of Dentistry, Nashville, 1894; died June 10; age 89.

Biddle, John W., Millville, Pa.; Philadelphia Dental College, 1899; died June 6; age 85.

Bing, Jacob J., Chicago; Northwestern University Dental School, 1897; died June 5; age 83.

Birchard, Horace D., Scranton, Pa.; University of Pennsylvania School of Dentistry, 1915; died June 16; age 63.

Blanks, Herbert C. III, New Orleans; Meharry Medical College School of Dentistry, Nashville, 1956; died May 31; age 28.

Bonebrake, Shaylor A., Chicago; Chicago College of Dental Surgery, 1926; died June 25; age 52.

Bonsole, Michael M., New York; College of Dental and Oral Surgery, New York, 1907; died March 20; age 71.

Bostelmann, Rudolph D., La Grange, Ill.; Northwestern University Dental School, 1897; died May 29; age 84.

Boylston, Norman E., Branchville, S. C.; Atlanta Dental College, 1917; died June 5; age 62.

Brockett, Dale E., Santa Ana, Calif.; University of Southern California School of Dentistry, 1918; died June 14; age 60.

Brooks, James H., Neillsville, Wis.; Northwestern University Dental School, 1900; died June 16; age 86.

Brush, Samuel W., Huntington, N. Y.; died February 1; age 78.

Burdats, Oscar W., Wheeling, W. Va.; Philadelphia Dental College, 1891; died June 19; age 86.

Burger, Jacob, New York; College of Dental and Oral Surgery, New York, 1907; died April 25; age 75.

Bush, John L., San Antonio, Texas; Baylor University College of Dentistry, Dallas, 1929; died June 7; age 54.

Canaday, Edward B., Portsmouth, Va.; died February 25; age 69.

Carroll, Jean Miller, Santa Monica, Calif.; Northwestern University Dental School, 1904; died June 13; age 88.

Carter, Roy Millard, Homestead, Fla.; Northwestern University Dental School, 1904; died May 25; age 74.

Cary, William J., Grand Rapids, Mich.; University of Michigan School of Dentistry, 1924; died May 24; age 56.

Chandler, Roscoe P., Reno, Nev.; died April 20; age 93.

Chaney, George W., Osceola, Mo.; died March 9; age 89.

Church, Aaron, New York; College of Dental and Oral Surgery, New York, 1917; died May 3; age 60.

Clark, James Paul, Bremerton, Wash.; Northwestern University Dental School, 1911; died May 23; age 74.

Clark, John W., Fort Wayne, Ind.; Indiana Dental College, 1924; died June 13; age 58.

Clay, Richard H., Tracy, Calif.; University of California College of Dentistry, 1939; died June 9; age 46.

Clemmer, Franklin B., Lakewood Club, Mich.; Chicago College of Dental Surgery, 1897; died June 8; age 86.

Clickener, William R., Harvel, Ill.; Indiana Dental College, 1904; died May 5; age 73.

Cole, Ray, Augusta, Ga.; Vanderbilt University School of Dentistry, Nashville, 1918; died May 7; age 60.

Cooke, Ray S., Tucson, Ariz.; Northwestern University Dental School, 1918; died June 11; age 67.

Coon, Arthur W., Norfolk, Va.; Royal College of Dental Surgeons, School of Dentistry, Toronto, 1923; died April 26; age 62.

Corley, Morris E., Chicago; Chicago College of Dental Surgery, 1902; died April 3; age 75.

Cozza, Franklin A., Tacoma, Wash.; North Pacific College of Oregon School of Dentistry, 1914; died June 1; age 66.

Cramer, Harry R., Richmond, Calif.; College of Physicians and Surgeons, San Francisco, 1926; died July 2; age 63.

Crookshank, Frederick A., New York; New York University College of Dentistry, 1897; died December 30, 1956; age 93.

Czeisler, Andor, New York; University of Pennsylvania School of Dentistry, 1935; died June 14; age 53.

Day, Ralph C., Vincennes, Ind.; Indiana Dental College, 1910; died May 17; age 71.

Dean, Archie L., San Antonio, Texas; University of Iowa College of Dentistry, 1910; died April 7; age 73.

DeMars, Raymond N., Milwaukee; Marquette University Dental School, 1924; died July 3; age 56.

Dessau, Andrew H., Lemay, Mo.; died May 25; age 72.

Dinham, William R., Portland, Ore.; North Pacific College of Oregon School of Dentistry, 1914; died July 6; age 70.

Dobson, Otis C., Los Angeles; University of Southern California School of Dentistry, 1918; died April 18; age 63.

Dooley, Francis L., East Northport, N. Y.; died June 12; age 77.

Dowell, Walter J., Oakland, Calif.; College of Physicians and Surgeons, San Francisco, 1905; died May 23.

Downen, Len, Ridgway, Ill.; Barnes Dental College, St. Louis, 1911; died May 22; age 72.

Dutton, Floyd E., East Wenatchee, Wash.; North Pacific College of Oregon School of Dentistry, 1926; died June 18; age 62.

Dyson, Albert H., Dallas, Texas; Meharry Medical College School of Dentistry, Nashville, 1911; died January 4; age 76.

Ellenberger, William, Willow Grove, Pa.; Marquette University Dental School, 1925; died July 6; age 55.

Emig, Armin R., Belleville, Ill.; St. Louis University School of Dentistry, 1939; died June 13; age 40.

Farmer, Albert O., Beverly Hills, Calif.; University of Southern California School of Dentistry, 1927; died June 19; age 54.

Fitzgerald, Paul, Greenville, N. C.; Washington University School of Dentistry, St. Louis, 1908; died June 21; age 74.

Fleming, John M., St. Louis; Washington University School of Dentistry, St. Louis, 1917; died June 18; age 62.

Gecker, Maria, New York; died April 11; age 77.

Goldman, Samuel, Boston; Tufts College Dental School, Boston, 1917; died May 23; age 61.

Goodes, Claude C., Detroit; University of Michigan School of Dentistry, 1898; died May 28; age 83.

Grant, Benere H., Inglewood, Calif.; College of Physicians and Surgeons, San Francisco, 1942; died June 17; age 44.

Gutzman, Hans, Chicago; University of Illinois College of Dentistry, 1927; died May 10; age 78.

Haines, Harry I., Coatesville, Pa.; Pennsylvania College of Dental Surgery, 1900; died May 29; age 83.

Halferty, Irwin H., Pittsburgh; University of Illinois College of Dentistry, 1909; died February 8; age 76.

Hamilton, Charles E., Westfield, Wis.; Chicago College of Dental Surgery, 1911; died January 8; age 70.

Hamilton, Spencer C., East Orange, N. J.; New York College of Dentistry, 1887; died June 15; age 92.

Hanks, Elmer E., Fort Wayne, Ind.; Indiana Dental College, 1908; died June 11; age 78.

Harrison, Will L., Jonesboro, La.; Vanderbilt University School of Dentistry, Nashville, Tenn., 1910; died May 24; age 67.

Harvey, Arthur C., Indianapolis; Indiana Dental College, 1910; died June 6; age 69.

Harvey, Max R., Chicago; Northwestern University Dental School, 1899; died April 22; age 81.

Hedge, Edwina W., Tampa, Fla.; University of Denver School of Dentistry, 1903; died March 5; age 79.

Henderlider, Earl A., Onawa, Iowa; Kansas City Dental College, 1898; died May 6; age 83.

Hennen, Albert Earl, Wheeling, W. Va.; University of Maryland Dental Department, 1908; died May 24; age 74.

Herbert, Charles J., Dorchester, Mass.; Washington University School of Dentistry, St. Louis, 1906; died June 11; age 72.

Herman, John E., Sandusky, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1902; died May 30; age 77.

Hernandez, Pedro H., Utuado, Puerto Rico; Baltimore College of Dental Surgery, University of Maryland, 1919; died February 11; age 57.

Hess, Claude O., Amarillo, Texas; Colorado College of Dentistry, 1916; died February 3; age 64.

Hester, Napoleon B., Palatka, Fla.; Meharry Medical College School of Dentistry, Nashville, 1914; died March 8; age 70.

Hinton, Walter R., Jr., Greensboro, N. C.; Atlanta-Southern Dental College, 1933; died May 28; age 48.

Holdridge, Percy A., New York; University of Buffalo School of Dentistry, 1903; died June 10; age 71.

Holley, Frank H., Sidney, N. Y.; Baltimore Medical College Dental Department, 1910; died March 25; age 71.

Hopkins, Garnett G., Sedalia, Mo.; St. Louis University School of Dentistry, 1918; died January 14; age 66.

Hunt, Ralph Y., Sedro Woolley, Wash.; Northwestern University Dental School, 1899; died April 22; age 79.

Hunt, William C., Washington, D. C.; Georgetown University School of Dentistry, 1925; died June 25; age 62.

Hyman, Benjamin H., Sarasota, Fla.; University of Illinois College of Dentistry, 1911; died April 16; age 67.

Inglehart, Cecil M., Brownsville, Texas; Texas Dental College, 1926; died May 28; age 57.

Jones, Homer W., Indianapolis; Indiana Dental College, 1917; died June 22; age 66.

Jones, James H., Parma, Mich.; University of Michigan School of Dentistry, 1900; died March 7; age 80.

Jones, Paul E., Greenville, Ohio; Ohio State University College of Dentistry, 1934; died March 8; age 47.

Jurewicz, John J., Patterson, N. J.; Loyola University School of Dentistry, Chicago, College of Dental Surgery, 1939; died May 31; age 43.

Kalish, Samuel I., Brooklyn, N. Y.; New York College of Dentistry, 1907; died June 4; age 78.

Kant, Robert G., Greenwich, Conn.; University of Pennsylvania School of Dentistry, 1942; died June 15; age 38.

Keating, James M., Sacramento, Calif.; College of Physicians and Surgeons, San Francisco, 1935; died June 6; age 47.

Kelly, Carlton, Walnut Grove, Miss.; Southern Dental College, Atlanta, 1915; died May 28; age 65.

Kemper, James T. C., Morrow, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1917; died June 15; age 65.

Kennon, John T., Dallas, Texas; State Dental College, Dallas, 1916; died February 24; age 67.

King, Albert E., Waynesburg, Pa.; Pittsburgh Dental College, Western University of Pennsylvania, 1908; died June 14; age 75.

Knecht, William D., Basking Ridge, N. J.; Pennsylvania College of Dental Surgery, 1899; died June 17; age 81.

Koepel, Frank E., Detroit; University of Michigan School of Dentistry, 1927; died June 23; age 52.

Kolb, Roy C., Mascoutah, Ill.; Washington University School of Dentistry, St. Louis, 1928; died June 19; age 53.

Kratky, Alfred H., LaJolla, Calif.; Northwestern University Dental School, 1914; died June 23; age 65.

Kyle, George A., Cleveland; Howard University College of Dentistry, Washington, D. C., 1913; died May 25; age 73.

Landis, Ernest S., Akron, Ohio; Cincinnati College of Dental Surgery, 1929; died June 28; age 56.

Langsfeld, Morton A., Philadelphia; Pennsylvania College of Dental Surgery, 1902; died May 29; age 76.

Levinson, Herman, Brooklyn, N. Y.; New York College of Dentistry, 1916; died May 18; age 65.

Lewis, Turner L., Childress, Texas; State Dental College, Dallas, 1908; died May 27; age 77.

Lipschultz, Irving, Hasbrouck Heights, N. J.; College of Dental and Oral Surgery, New York, 1917; died June 15; age 63.

Lund, William F., Omaha; Creighton University College of Dentistry, Omaha, 1915; died June 24; age 63.

Maassen, Frank, Harlan, Iowa; Drake University College of Dentistry, Des Moines, 1913; died May 15; age 70.

Markham, Frederic H., Syracuse; University of Pennsylvania School of Dentistry, 1937; died June 25; age 44.

Matthews, Thomas J., Brooklyn, N. Y.; College of Dental and Oral Surgery, New York, 1923; died June 18; age 57.

McCauley, George W., Dayton, Wash.; North Pacific College of Oregon School of Dentistry, 1912; died May 23; age 75.

McClain, Preston L., Baltimore; Baltimore College of Dental Surgery, University of Maryland, 1927; died May 25; age 54.

McParland, Joseph F., Dubuque, Iowa; Chicago College of Dental Surgery, 1898; died April 5; age 88.

Miller, Frederick W., Mission, Kan.; St. Louis University School of Dentistry, 1910; died June 17; age 68.

Montfort, Woodson W., Woodville, Miss.; Tulane University School of Dentistry, New Orleans, 1909; died March 2; age 75.

Mosley, Thomas E., Seneca, Mo.; St. Louis University School of Dentistry, 1915; died May 21; age 64.

Nelson, Joseph F., Parsons, Kan.; died April 28; age 73.

Nockow, Robert H., Jackson Heights, N. Y.; New York College of Dentistry, 1918; died April 23; age 67.

Nowicki, Edward, St. Petersburg, Fla.; University of Illinois College of Dentistry, 1921; died June 12; age 68.

O'Connor, Charles D., Chicago; Chicago College of Dental Surgery, 1931; died May 22; age 50.

Officer, Olive M., Chicago; Northwestern University Dental School, 1908; died June 14; age 70.

O'Sullivan, William C., Lewiston, Maine; Louisville College of Dentistry, 1905; died June 24; age 81.

Palmer, Fred C., Detroit; University of Michigan School of Dentistry, 1911; died April 21; age 72.

Patriquin, Forrest D., West Hartford, Conn.; Tufts College Dental School, Boston, 1919; died June 13; age 59.

Perkins, Henry C., Louisville, Ga.; died June 15; age 78.

Phillips, Charles E., Fresno, Calif.; died June 21; age 78.

Pitts, Leonard B., McIntosh, S. D.; Northwestern University Dental School, 1917; died April 20; age 62.

Powelson, Harry D., Bound Brook, N. J.; University of Pennsylvania School of Dentistry, 1900; died June 7; age 81.

Putnam, Lynn L., Detroit; University of Michigan School of Dentistry, 1928; died June 23; age 52.

Riniker, John L., Sioux City, Iowa; Keokuk Dental College, Iowa, 1902; died April 22; age 79.

Robeson, Mary G., Moline, Ill.; Northwestern University Dental School, 1900; died May 17; age 86.

Robinson, Daniel K., Chicago; Northwestern University Dental School, 1923; died June 15; age 59.

Rosten, Jay, Brooklyn, N. Y.; New York College of Dentistry, 1915; died June 18; age 66.

Rotzoll, Albert M., Chicago; University of Illinois College of Dentistry, 1910; died June 1; age 73.

Russell, Robert M., Fort Worth; Northwestern University Dental School, 1914; died May 29; age 69.

Ryan, Donald T., Binghamton, N. Y.; Georgetown University School of Dentistry, 1936; died March 22; age 46.

Sakrais, Solomon Z., Brooklyn, N. Y.; New York College of Dentistry, 1922; died March 29; age 59.

Schenk, Rudolph E., South Bend, Wash.; North Pacific College of Oregon School of Dentistry, 1901; died May 24; age 81.

Schenker, Clara E., Philadelphia; Temple University School of Dentistry, 1907; died June 16; age 80.

Seeley, Clifton M., Oak Harbor, Ohio; Western Reserve University School of Dentistry, Cleveland, 1908; died May; age 71.

Sexton, Harry L., Allenhurst, N. J.; Philadelphia Dental College, 1904; died June 7; age 78.

Shadburne, John T., Windsor, Mo.; Kansas City Dental College, 1916; died March 18; age 67.

Sharlach, R. Maurice, White Plains, N. Y.; College of Dental and Oral Surgery, New York, 1918; died June 17; age 71.

Shirley, Farnandis G., Elizabeth, N. J.; Howard University College of Dentistry, Washington, D. C., 1921; died June 27; age 62.

Wight, Verne W., Yakima, Wash.; University of Pennsylvania School of Dentistry, Philadelphia, 1908; died May 1956; aged 70.

Wigle, Lewis W., Detroit; Detroit College of Medicine, Department of Dental Surgery, 1895; died March 11, aged 85.

Williams, Glenn P., Milwaukee; Marquette University Dental School, Milwaukee, 1929; died March 12; aged 54.

Williams, James B., Waterbury, Conn.; Pennsylvania College of Dental Surgery, Philadelphia, 1902; died March 4; aged 80.

Williams, Sylvester N., Del Rio, Texas; died Feb. 22; aged 75.

Wilson, Charles W., Renton, Wash.; died March 29; aged 78.

Wilson, David M., Buffalo; University of Maryland Dental Department, Baltimore, 1892; died March 27; aged 88.

Wisterman, Robert M., McComb, Ohio; University of Illinois College of Dentistry, Chicago, 1932; died March 9; aged 56.

Woodle, Jerome M., Brooklyn; New York College of Dentistry, 1904; died April 7; aged 73.

Zun, Charles H., Chicago; Chicago College of Dental Surgery, 1919; died March 7; aged 66.

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Prosthodontics, Partial: Douglas H. Yock, School of Dentistry, University of Minnesota, Minneapolis

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Research: Alton K. Fisher, College of Dentistry, State University of Iowa, Iowa City

Roentgenology: Donald T. Waggener, 800 S. 13th St., Lincoln, Neb.

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Eighth Annual Session	Nov. 4-7, 1957	Miami, Fla.
Ninety-Ninth Annual Session	Nov. 10-13, 1958	Dallas, Texas
One-Hundredth Annual Session	Sept. 21-24, 1959	New York
One Hundred and First Annual Session	Oct. 17-20, 1960	Los Angeles
One-Hundred and Second Annual Session	Oct. 16-19, 1961	Philadelphia

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 24-26, 1958	Montgomery	C. R. Crook	Professional Center, Montgomery
Alaska	June 3-6, 1958	Palmer	C. L. Polley	Box 1896, Juneau
Arizona	Apr. 16-19, 1958	Tucson	W. G. Burke	15 E. Monroe St., Phoenix
Arkansas	Apr. 13-16, 1958	Little Rock	D. M. Hamm	Box 89, Clarksville
California	Apr. 20-23, 1958	San Francisco	W. J. Healy	450 Sutter St., San Francisco
S. California	Apr. 14-16, 1958	Los Angeles	S. M. Silverman	903 Crenshaw Blvd., Los Angeles 19
Colorado			G. H. Jackson	724 Republic Bldg., Denver
Connecticut	May 14, 15, 1958	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			A. G. Schiek	3716 Philadelphia Pike, Claymont
District of Columbia	Mar. 9-12, 1958	Washington	J. F. Keaveny	1029 Vermont Ave., N.W., Washington
Florida	May 18-21, 1958	Miami Beach	G. J. Perdigon	17 Davis Blvd., Tampa
Georgia			J. W. Yarbrough	Southern United Bldg., Macon
Hawaii	June 15-19, 1958	Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu
Idaho	May 1958	Boise	G. L. Williamson	1003½ Main St., Boise
Illinois	May 11-14, 1958	Springfield	P. W. Clopper	632 Jefferson Bldg., Peoria
Indiana	May 19-21, 1958	Indianapolis	W. R. Shoemaker	Citizens Bank Bldg., Anderson
Iowa	May 5-7, 1958	Des Moines	H. I. Wilson	Insurance Exchange Bldg., Des Moines
Kansas	May 5-8, 1958	Kansas City, Mo.	F. A. Richmond	Brotherhood Bldg., Kansas City 1
Kentucky	Mar. 23-26, 1958	Louisville	A. B. Coxwell, Jr.	2208 Dundee Rd., Louisville 5
Louisiana	Apr. 9-12, 1958	Monroe	J. S. Bernhard	2515 Line Ave., Shreveport
Maine			S. M. Gower	Box 27, Skowhegan
Maryland	May 4-7, 1958	Baltimore	C. L. Inman, Jr.	Medical Arts Bldg., Baltimore
Massachusetts	May 4-7, 1958	Boston	H. E. Tingley	12 Bay State Rd., Boston 15
Michigan	Apr. 28-30, 1958	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Apr. 14-16, 1958	St. Paul	C. V. E. Cassel	2236 Marshall Ave., St. Paul 4
Mississippi	June 9-11, 1958	Biloxi	B. A. Cohen	500-E E. Woodrow Wilson Dr., Jackson 27
Missouri	May 4-7, 1958	Kansas City	E. D. Suggett	Merchants Bank Bldg., Jefferson City
Montana	May 1-3, 1958	Butte	R. C. Ritter	28 N. Black St., Bozeman
Nebraska	Apr. 28-30, 1958	Omaha	F. A. Pierson	Federal Securities Bldg., Lincoln
Nevada	June 1958	Reno	O. M. Seifert	755 Ryland Ave., Reno
New Hampshire	June 22-24, 1958	Whitefield	F. E. Williams	814 Elm St., Manchester
New Jersey	May 18-21, 1958	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 25-28, 1958	Las Cruces	J. S. Eilar	7 Medical Arts Sq., N.E., Albuquerque
New York	May 12-14, 1958	Buffalo	C. A. Wilkie	1 Hanson Pl., Brooklyn 17
North Carolina	May 4-7, 1958	Pinehurst	L. H. Butler	Jefferson Bldg., Greensboro

State	Date	Place	Secretary	Address
North Dakota	May 4-7, 1958	Bismarck	J. H. Pfister	419½ Dakota Ave., Wahpeton
Ohio			E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 20-23, 1958	Oklahoma City	L. D. Wright	Osler Bldg., Oklahoma City
Oregon	Mar. 3-5, 1958	Portland	T. D. Holder	Selling Bldg., Portland
Panama Canal Zone	Apr. 1958	Ancon	W. R. Bond, Jr.	U.S.A., Ft. Kobbe Dental Clinic, Ft. Kobbe
Pennsylvania	May 21-23, 1958	Harrisburg	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico	January 1958		R. Borges	Box 843, Arecibo
Rhode Island	Jan. 28, 29, 1958	Providence	W. F. Decesare	216 Broadway, Providence
South Carolina	May 11-13, 1958	Myrtle Beach	J. E. Wallace	1506 Gregg St., Columbia
South Dakota	May 11-13, 1958	Mitchell	R. E. Decker	Box 308, Parker
Tennessee	May 12-15, 1958	Chattanooga	K. P. Ezell	116 N. Academy, Murfreesboro
Texas	May 3-6, 1959	San Antonio		3707 Gaston Ave., Dallas 10
Utah	May 22-24, 1958	Salt Lake City	R. C. Dalgleish	State Capitol Bldg., Salt Lake City
Vermont	May 25-27, 1958	Manchester	E. H. Van Santvoord	22 Washington St., Rutland
Virginia	May 4-7, 1958	Richmond	W. T. McAfee	Colonial National Bank Bldg., Roanoke
Washington	Mar. 24-26, 1958	Seattle	W. P. Brust	Medical Center, Everett
West Virginia	July 20-23, 1958	White Sulphur Springs	G. N. Casto, Jr.	710½ Lee St., Charleston
Wisconsin	Apr. 21-23, 1958	Milwaukee	H. O. Hoppe	1331 W. Vliet St., Milwaukee
Wyoming	June 12-14, 1958	Casper	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 8-13* June 9, 10.† 1958	Birmingham	W. L. McCarty	Professional Center, Montgomery
Alaska			R. H. Williams	Box 2122, Juneau
Arizona			W. G. Biddulph	1502 W. Osborn Rd., Phoenix
Arkansas	June 16-20, 1958	Little Rock	W. T. Jones	107 E. Shelton, Monticello
California			D. R. Grant	507 Polk St., San Francisco
Colorado			R. F. Gilmore	Republic Bldg., Denver 2
Connecticut	Nov. 18-20* Nov. 22, 23* Nov. 21† Nov. 22, 23†	Boston Bridgeport Bridgeport	C. G. Brooks	302 State St., New London
Delaware			P. K. Musselman	143 W. Main St., Newark
District of Columbia	Jan. 6-10, 1958	Washington	W. T. Birthright	1835 Eye St., N.W., Washington
Florida			R. P. Taylor, Jr.	P. O. Box 2913, Jacksonville 3
Georgia	June 9-11, 1958	Atlanta	W. G. Brown	Blackshear
Hawaii			J. Y. Ing	James Campbell Bldg., Honolulu
Idaho			A. G. DeWinter	Sun Bldg., Boise
Illinois			W. A. McKee	Wood Bldg., Benton
Indiana	Dec. 2-5*†	Indianapolis	C. A. Frech	Gary National Bank Bldg., Gary
Iowa	June 2-6, 1958*†	Iowa City	P. A. Hahn	Farmers & Merchants Bank Bldg., Burlington
Kansas			G. L. Teall	Box 71, Hiawatha
Kentucky			J. J. Kelly	102 W. Madison St., Franklin
Louisiana			R. C. Steib	Maison Blanche Bldg., New Orleans
Maine			A. S. Appleby	Box 260, Skowhegan
Maryland	Nov. 18-20‡		W. D. Burton	829 Park Ave., Baltimore 1
Massachusetts			A. M. Bommer	349 Broadway, Revere
Michigan	Jan. 19-25 June 8-14, 1958	Ann Arbor	J. L. Champagne	3714 W. McNichols Rd., Detroit 21
Minnesota			M. G. Walls	Lowry Bldg., St. Paul
Mississippi	Jan. 6-8, 1958*†‡		A. H. Richter, Jr.	Aven Bldg., Greenwood

State	Date	Place	Secretary	Address
Missouri			R. R. Rhoades	Central Trust Bldg., Jefferson City
Montana			R. O. Betzner	303 Power Block, Helena
Nebraska			H. E. Weber	Stuart Bldg., Lincoln
Nevada			A. A. Cozzalio	130 N. Virginia, Reno
New Hampshire	June 19, 20* June 19,† 1958	Boston	S. G. Markos	8 Renaud Ave., Dover
New Jersey			C. J. Schweikhardt	150 E. State St., Trenton 8
New Mexico			J. J. Clarke, Sr.	Artesia
New York	Dec. 10-13*‡		D. W. Beier	23 S. Pearl St., Albany 7
North Carolina			J. H. Guion	Doctors Bldg., Charlotte 7
North Dakota	July 7-11, 1958	Fargo	G. F. Wirtz	Clinic Bldg., Mandan
Ohio			D. E. Bowers	322 E. State St., Columbus 15
Oklahoma			W. E. Cole	2420 N. Meridian, Oklahoma City
Oregon	Dec. 16-18*†	Portland	F. L. Utter	Pioneer Trust Bldg., Salem
Pennsylvania	Dec. 2-6*‡ Dec. 2-4†‡		R. E. V. Miller, Sr.	Dept. of Public Instruction, Box 911, Harrisburg
Puerto Rico			J. Mercado C.	Comercio St. #452, San Juan
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina			W. J. Brockington	1508 Washington St., Columbia 1
South Dakota			H. T. Aker	Canton
Tennessee	Dec. 16-20‡		C. R. Alta	Bennie-Dillon Bldg., Nashville
Texas			R. T. Weber	Capital National Bank Bldg., Austin 16
Utah			A. Ridge, Jr.	10 S. Second E., Provo
Vermont	June 23-25, 1958*†	Burlington	P. M. Fitch	Newport
Virginia			J. M. Hughes	Medical Arts Bldg., Richmond
Washington			F. S. Rotchford	1108 S. Washington St., Olympia
West Virginia	June 23-25, 1958	West Liberty	C. C. Cottrill	Box 111, Glen Rogers
Wisconsin			S. F. Donovan	Tomah
Wyoming			W. A. Hocker	O & S Bldg., Casper

Most states require applications to be in 30 days prior to examination date.
*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
Academy of Dentistry for the Handicapped	Feb. 2, 1958	Chicago	M. L. Bramer Secy.	3405 W. North Ave., Chicago
American Academy of Crown and Bridge Prosthodontics	Feb. 1-2, 1958	Chicago	C. E. Brooks Secy.	4500 Olive St., St. Louis 8
American Academy of Dental Medicine	Dec. 8	New York	G. J. Witkin Secy.	45 S. Broadway, Yonkers, N.Y.
American Academy of Dental Practice Administration	Jan. 30, 31, 1958	Chicago	R. H. Campbell Secy.	18595 Grand River, Detroit 23
American Academy of Implant Dentures	Nov. 2-4	Miami, Fla.	P. S. Loechler Secy.	540 N. California, Stockton, Calif.
American Academy of Maxillofacial Prosthetics	Jan. 30, 31, 1958	Chicago	H. C. Sullivan Secy.	1516 Wealthy St., S.E., Grand Rapids 6, Mich.
American Academy of Oral Pathology	Mar. 30, 31, 1958	Washington, D.C.	J. L. Bernier Secy.	Armed Forces Institute of Pathology, Washington 25, D.C.
American Academy of Restorative Dentistry	Feb. 1, 2, 1958	Chicago	A. G. James Secy.	409 N. Camden Dr., Beverly Hills, Calif.
American Association for Cleft Palate Rehabilitation	Apr. 24-26, 1958	San Francisco	D. C. Spriestersbach Secy.	Dept. of Otolaryngology, University Hospitals, Iowa City
American Association of Dental Schools	Mar. 23-26, 1958	Detroit	M. W. McCrea Secy.	University of Minnesota, School of Dentistry, Minneapolis 14
American Association of Endodontists	Jan. 31-Feb. 2, 1958	Chicago	V. B. Milas Secy.	2559 W. 63rd St., Chicago 29

Name	Date	Place	Secy. or Chm.	Address
American Association of Industrial Dentists	Apr. 21-23, 1958	Atlantic City, N.J.	E. R. Aston Secy.	Pennsylvania Dept. of Health, P.O. Box 90, Harrisburg, Pa.
American Association of Orthodontists	Apr. 27-May 1, 1958	New York	E. E. Shepard Secy.	8230 Forsyth Blvd., St. Louis 24
American Board of Oral Pathology	Dec. 7, 8		D. A. Kerr Secy.	University of Michigan, School of Dentistry, Ann Arbor, Mich.
American Board of Oral Surgery	Dec. 2 Apr. 5-8, 1958	Chicago	L. M. FitzGerald Secy.	Roshek Bldg., Dubuque, Iowa
American Equilibration Society	Jan. 30, 1958	Chicago	W. W. Hurst Secy.	820 S. Damen Ave., Chicago 12
American Public Health Association	Nov. 11-15	Cleveland	R. M. Atwater Exec. Secy.	1790 Broadway, New York 19
American Society of Oral Surgeons	Oct. 30-Nov. 2	Miami Beach, Fla.	A. B. Coxwell Exec. Secy.	2208 Dundee Rd., Louisville 5, Ky.
Asian Dental Congress (Second) and Asian-Pacific Dental Conference	Mar. 24-30, 1958	Manila, Philippines	B. B. Erana Pres. Elect	P. O. Box 373, Manila, Philippines
Chicago Dental Society	Feb. 2-5, 1958	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago
Cincinnati Dental Society	Mar. 23-25, 1958	Cincinnati	H. F. Lee Chm.	3180 Harrison Ave., Cincinnati 11
Cleveland Dental Society	Apr. 28-30, 1958	Cleveland	G. A. Blizil Exec. Secy.	1220 Huron Rd., Cleveland 15
Council on Dental Education, Dental Aptitude Tests	Jan. 10, 11 Apr. 25, 26, 1958		S. Peterson Secy.	222 E. Superior St., Chicago
Dallas Mid-Winter Dental Clinic	Jan. 26-29, 1958	Dallas	W. W. Sherrill Exec. Secy.	2609 Cedar Springs, Dallas, Texas
Denver Dental Association	Jan. 5-8, 1958	Denver	E. T. Klein Secy.	Republic Bldg., Denver 2
Greater New York Dental Meeting	Dec. 9-13	New York	I. Teich Secy.	Hotel Statler, New York 1
Greater Philadelphia Annual Meeting	Mar. 25-28, 1958	Philadelphia	M. Kohn Exec. Secy	Sheraton Hotel, 17th St. and Pennsylvania Blvd, Philadelphia 3
International Association for Dental Research	Mar. 20-23, 1958	Detroit	D. Y. Burrill Secy.	129 E. Broadway Louisville 2, Ky.
Mexican Dental Association, Fourth Congress	Nov. 10-14	Mexico City	E. Martinez R. Secy.	Sinaloa 9, Mexico, D.F.
Mid-Continent Dental Congress	Nov. 17-20	St. Louis	J. E. Brophy Exec. Secy.	8013 Maryland Ave., St. Louis 5
National Association of Dental Auxiliaries	Nov. 6	Miami Beach, Fla.	M. G. Kulstad Chm.	1914 Roosevelt St., Bakersfield, Calif.
National Board of Dental Examiners	Dec. 2, 3		G. J. Casey Secy.	222 E. Superior St., Chicago
New Orleans Dental Conference	Nov. 10-14	New Orleans	E. Burvant Secy.	Maison Blanche Bldg., New Orleans
Ninth District Dental Society of Montana	Jan. 16-18, 1958	Billings	C. H. Betzer Secy.	1231 N. 29th St., Billings, Mont.
Northwest Academy of Dental Medicine	Apr. 22-26, 1958	Victoria, B.C., Canada	G. Underwood Secy.	Selling Bldg., Portland, Ore.
Pan American Odontological Association	Dec. 11	New York	R. H. Brodsky Exec. Secy.	14 E. 81 St., New York
Puerto Rico Dental Conference	Nov. 9-12	San Juan	A. R. Baralt, Jr. Dean	School of Dentistry, University of Puerto Rico San Juan, Puerto Rico
Thirty-First Journees Dentaires Internationales de Paris	Nov. 25-Dec. 1	Paris, France	R. Ibos	14 Ave. Gabriel-Peri, Antony, Seine, France
Thomas P. Hinman Dental Clinic	Mar. 16-19, 1958	Atlanta, Ga.	H. Wallace Secy.	1415 The Byway, N.E., Atlanta, Ga.
Uruguayan Dental Society, Fourth International Meeting	Nov. 20-22		H. Sacchi	Vazquez 1414, P.5, Montevideo, Uruguay

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CLASSIFIED ADVERTISING

Forms close on 20th of second month preceding month of issue

Remittance Must Accompany Classified Ads.

Classified advertising rates are as follows:
30 words or less—per insertion.....$6.00
Additional words, each..... .15
Answers sent c/o American Dental Association.....no extra charge
Replies to A.D.A. box number ads should be addressed as follows:
American Dental Association
222 E. Superior Street
Chicago 11, Ill. Box.....
Please be sure that the box number appears on the envelope.

PRACTICES AND OFFICES FOR SALE AND/OR RENT

CALIFORNIA—San Joaquin Valley. For lease, fine dental suite in Class A building, refrigerated air conditioning. Prime location near multi-million dollar civic center. In trade area of 150,000. Excellent opportunity for young diligent practitioner. For information contact Manager, Haberfelde Bldg., 1706 Chester Ave., Bakersfield, Calif.

•

CALIFORNIA—Dental suite in new Medical-Dental Bldg., Hughson, (near Modesto) Calif. Approximately 600 sq. ft. Share waiting room with M.D. (presently in practice). Unopposed professionally. Open on length of lease. Write: J. Sheen, M.D., Box 688, Hughson, Calif. Phone: TUxedo 3-4401.

•

CALIFORNIA—For lease, beautiful dental office in San Diego beach area. Referral opportunities excellent in medical group adjacent. Four operatories, laboratory, etc. Water paid. Rental $248 per month. Contact Dr. Ralph Coleman, 1805 Cable St., San Diego 7, Calif.

•

COLORADO—For sale or rent. New Completely equipped dental office. Two chairs, laboratory, retiring room, business office, including individual office building and parking facilities. Lucrative practice. Terms. Address A.D.A. Box No. 763.

•

COLORADO—For sale. Long established ideal practice. Excellent opportunity. County-seat town, 12,000, in center of oil development. Unlimited potential. Retiring. Write or call Dr. C. A. Greenawalt, Sterling, Colo.

•

CONNECTICUT—For sale. Three-chair modern general practice, dental office in air-conditioned building, $15,000 terms. Dentist, age 47, will stay with buyer for six months and share expenses, refer patients and then retire to Florida. Address A.D.A. Box No. 534.

•

FLORIDA—Anna Maria Island. For rent in newly completed Medical Arts Bldg. Excellent opportunity for orthodontist, serving Bradenton-Sarasota area. Three operating rooms. Option to purchase later. Address A.D.A. Box No. 764.

•

ILLINOIS—For sale. Established oral surgery practice in attractive downtown business building. For complete information address replies to A.D.A. Box 765.

•

KANSAS—For sale. Sound growing 12,000 community, irrigation, cattle, wheat, oil, near mountains, Junior college. Three-chair office, x-ray, laboratory. Will sell, lease, rent, all or part. Dentist retiring. Write Dr. R. M. Fenton, 312½ N. Main, Garden City, Kan.

MASSACHUSETTS—For sale. Fully equipped modern dental office. Same location 35 years. Mansfield, Mass. town of 7,500 population, located midway between Boston and Providence on New Haven railroad. Active, well-established, remunerative practice. Dentist deceased. Reasonably priced, financing arranged, inquiries invited. Mrs. A. D. Williamson, 55 Benefit St., Mansfield.

•

MASSACHUSETTS—South Shore. Established practice for sale, by young dentist entering the service. Modern two-chair, air-conditioned office, employing an assistant and hygienist. Address A.D.A. Box No. 766.

•

MICHIGAN—For lease. Combination three-chair office, three bedroom furnished home and active young practice of 10 years in central Michigan. Stable area, good fees. Address A.D.A. Box No. 767.

•

NEW JERSEY—Monmouth County. For sale. Two-chair, air-conditioned office. Rent $70 per month. Established 15 years. Active. Moving out of state. $4,800 for immediate sale. Address A.D.A. Box No. 588.

•

NEW YORK—For sale. Dental office, fully equipped, retiring; established 35 years, with adjoining three apartment if desired. Dr. I. Lefkowitz, 295 Saratoga Ave., Brooklyn 33.

•

NEW YORK—For sale, New York City, established over 30 years. Excellent clientele, fully equipped, grossed between $40,000 and $50,000 in each of last four years. Please state qualifications and background fully in correspondence. Address A.D.A. Box No. 768.

•

NORTH CAROLINA—Office space for rent. Modern building occupied by optometrist. Excellent central location on main street, ground floor, beautiful joint reception room, air conditioned. Space available for two operating rooms. Fine opportunity to become established in growing community. Write Dr. A. L. Sobol, Box 683, Wilmington, N. C.

•

PENNSYLVANIA — For sale. Levittown. Fully equipped, bungalow office with income producing apartment. Choice location. Good opportunity for general dentist. Air conditioned. Other features. Leaving to specialize. Address P. O. Box 116, Penndel, Pa.

•

PENNSYLVANIA—For sale. Practice and equipment. First floor, air-conditioned office in college town with large rural drawing. Excellent income. Reasonably priced. Reason—dentist deceased. Contact Mrs. C. H. Muth, 521 W. Neshannock Ave., New Wilmington, Pa., Phone 3867.

PENNSYLVANIA — For sale. Ranch-type home with adjoining modern dental office in Philadelphia, choice suburb. Undergoing rapid development; on main thoroughfare. Mortgage arrangement. Excellent opportunity for right man. Equipment not included. Address A.D.A. Box No. 769.

•

PENNSYLVANIA—For rent, leading to possible association, space in modern, fully equipped office. Excellent location; ground floor; auxiliary personnel. Please write for particulars. Address Dr. Edward L. Martin, 616 W. Chestnut St., Lancaster, Pa.

•

SOUTH DAKOTA—Practice for sale. Very active practice in eastern South Dakota town of 1,500. Good farming area. Air-conditioned, two-chair office, well equipped. Leaving to specialize. Address A.D.A. Box No. 770.

•

TENNESSEE—For sale. Modern two-chair office, complete with all necessary equipment and supplies. In service. Contact Dr. H. A. Akin, Paris, Tenn.

OPPORTUNITIES AVAILABLE

CALIFORNIA—Glendale. Partitioned suite in attractive medical arts building. 210 N. Central Ave., $165 per month. Phone Citrus 1-1188 or Chapman 5-2100.

•

CALIFORNIA—Will build for dentist at San Clemente, Calif. Splendid location. Dr. Kenneth C. Jones, 2218 Serrano Rd., San Bernardino, Calif.

•

ILLINOIS—New dental clinic under construction in shopping center, desires orthodontist or general practitioner. Excellent opportunity for either. Prosperous college town near Chicago. Tenant may design floor plan to his specifications. Completion of this area could be expected in one month. Will rent at cost first year. Call Dr. Dale Jenkins at DeKalb 64712 or 66404 or write 242 E. Lincoln Hwy., DeKalb, Ill.

•

ILLINOIS—Wanted dentist for civil service position in institution with 5,400 mentally retarded patients. Minimum salary of $453 per month with a maximum salary of $553 per month. Starting salary based on individual qualifications and experience. Fringe benefits include maintenance, 11 holidays per year, sick time, and two weeks paid vacation per year. Send full details to Joseph Albaum, M. D., Lincoln State School, Lincoln, Ill.

•

ILLINOIS—For sale. Owner retiring. Dental practice in town of 10,000. Best agricultural section in western Illinois. Near Mississippi river. Practice largely orthodontics. Address A.D.A. Box No. 771.

•

INDIANA—600 sq. feet dental office in new medical building in Merrillville. One mile south of Gary, Ind. Write or phone R. J. Doherty, M. D., R.R. 5, Crown Point, Ind.

IOWA—Wanted: A dentist. Our only dentist had the misfortune to develop ill health, and had to quit his practice. Our town has 1,500 people; is a progressive place with a community hospital, municipal swimming pool, excellent school, and many new homes. We can furnish a fine, brick, ground-floor office at an absurdly low rental: $26 per month, and this in a new and modern building. That's how desperate we are for a dentist. Right away. Alta Commercial Club, Alta, Iowa.

•

MAINE—Dental office, modern, fully equipped, two operating rooms, laboratory, reception room on ground floor in business building. Always busy practice. Low rental. Priced very reasonably because of illness. Dr. James H. Cunningham, 35 Cottage St., Bar Harbor, Me.

•

MASSACHUSETTS—Exceptional opportunity for young dentist to take over office and practice, and equipment if desired, of Dr. A. H. Knapp, in very desirable location in Pittsfield, Mass. Dr. Knapp, who died a month ago, occupied this location for 28 years. Address W. T. Butler, P. O. Box 877, Pittsfield, Mass.

•

MISSOURI—Associate wanted in very modern dental office or will sell. Town 20,000. Large trade territory. Could use more dentists here very nicely. Will make a good deal either way. Address A.D.A. Box No. 627.

•

NORTH DAKOTA—Dentist wanted, immediately, in a large, prosperous agricultural area. Office space in a new clinic in connection with a general hospital where facilities for x-ray and oral surgery are available. Please contact Stuart J. Cook, M. D., Rolette, N. D.

•

OKLAHOMA—Young dentist with Oklahoma license for association with group of six physicians and one other dentist. Practice already well established—equipment furnished in air-conditioned clinic—must be draft exempt—under 40. Write M. J. Sugarman, M. D., Medical Director, Community Hospital-Clinic, Elk City, Okla.

•

OREGON—Medical and dental office space; will complete interior to specification. Call or write Roy Harland, Masonic Bldg., Salem, Ore.

•

PENNSYLVANIA—Associate wanted for a modern four-chair office in northwestern Pennsylvania (Community of 20,000). State qualifications and postgraduate courses taken. Address A.D.A. Box No. 773.

•

SOUTH CAROLINA—Ideal building for dental office. Centrally located. Adequate parking. Town of 5,000 with no dentist. On grounds with practicing medical doctor who will refer patients. Good income from start. Write Box 545-A, Cayce, S. C., or call Dr. William Ramsey, Columbia, S. C.

•

TEXAS — Approved prosthetic residency available July, 1958, in 1,300-bed general hospital, affiliated with Texas Dental School. Stipend $2,840-$3,550 per annum. Apply Chief, Dental Service, VA Hospital, Houston, Texas.

VIRGINIA—Arlington. Four miles from the White House. Well-established dental practice. Unusually desirable location and valuable real estate, now showing substantial income. Associate, or rent, with purpose of taking over practice and property. Reason: retirement. Address Dr. C. E. Byers, 4300 Columbia Pike, Arlington 4, Va.

•

WASHINGTON—Foreign missionary work. Excellent opportunity for qualified men in all parts of the world. For details apply to The Missionary Dentist, 5543 25th Ave., N.E., Seattle 5.

HYGIENISTS AND ASSISTANTS

ILLINOIS — Position wanted—experienced dental assistant (certified) excellent references—desires position with general practitioner—Florida (East Coast preferred). Address A.D.A. Box No. 774.

•

LOUISIANA—Position available in New Orleans, the South's most interesting city. Five day week. Liberal commission and monthly guarantee. Address A.D.A. Box No. 756.

•

NEW MEXICO—Albuquerque. Hygienists badly needed; wonderful opportunity in an ideal and healthy climate, friendly, progressive, and growing city, $450 per month guaranteed, plus two weeks vacation and other benefits. Address A.D.A. Box No. 772.

•

VIRGINIA—Dental hygienist with public health degree or experience to administer a school dental health program. Salary $3,990 with automatic increments to $4,740 in six yrs.; 40 hour week; travel allowance for use of personal car; annual vacation and sick leave; State retirement and Social Security benefits. Apply Director of School Health, Arlington County School Board, 1426 N. Quincy St., Arlington, Va.

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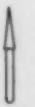
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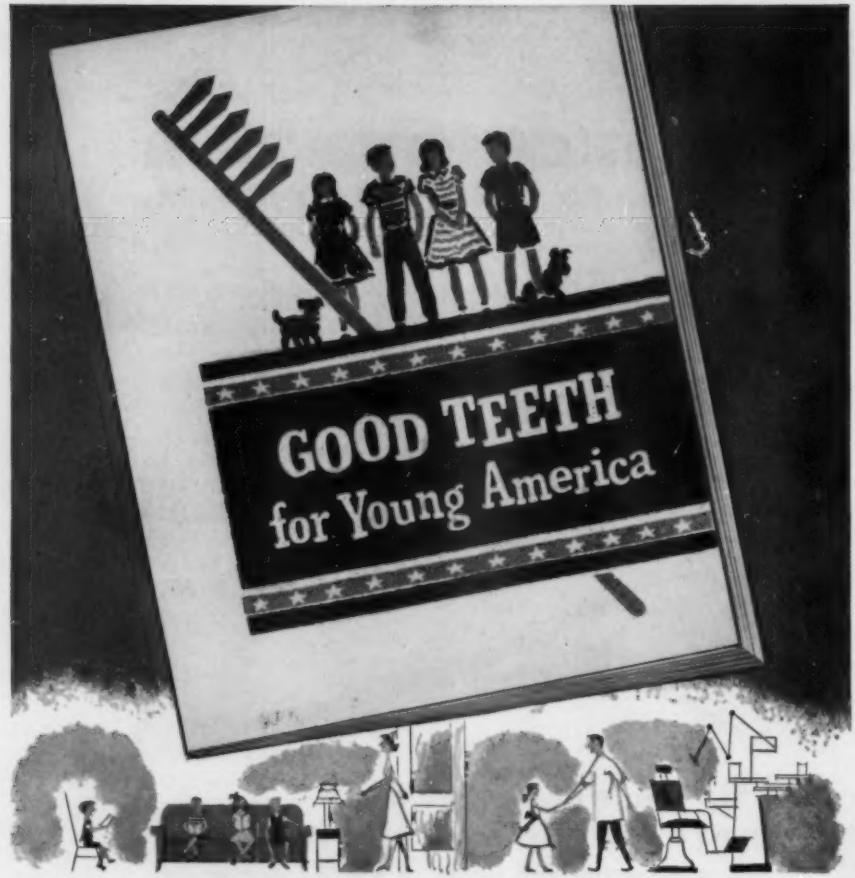

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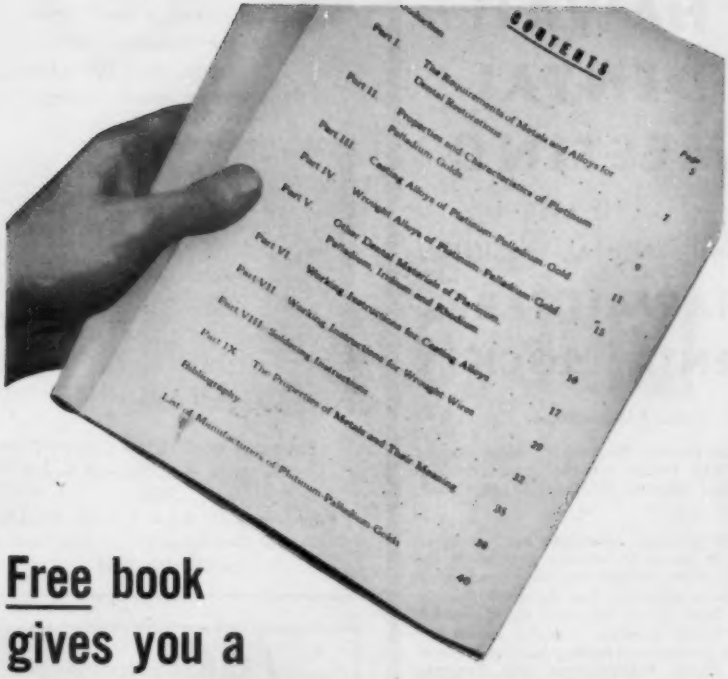

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A dish of oatmeal helps fulfill the requirements of such a breakfast: It provides readily available energy; it helps to allay hunger throughout the morning; it makes a notable contribution to the day's nutritional needs; it fits into virtually every breakfast, including most of those especially low in calories.*

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Oatmeal, 1 oz. Skim milk, 4 oz.	Oatmeal, 1 oz. Milk, 4 oz.	Oatmeal, 1 oz. Milk, 4 oz.
Toast, 1 slice lightly buttered	One egg	Two eggs
†Coffee without cream or sugar	Toast, 2 slices with butter or jelly	Bacon, 2 strips
	†Coffee	Toast, 2 slices with butter or jelly
†For children substitute 4 oz. skim milk		†Coffee

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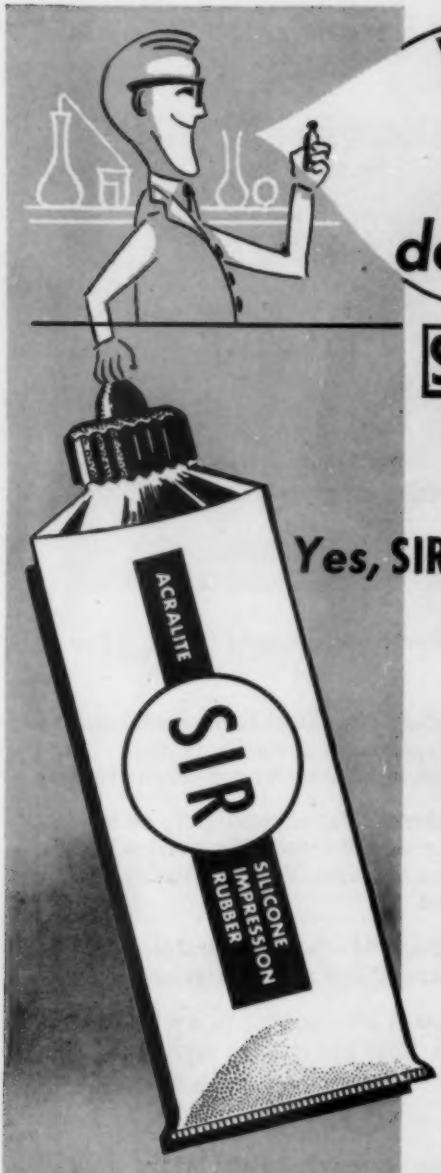

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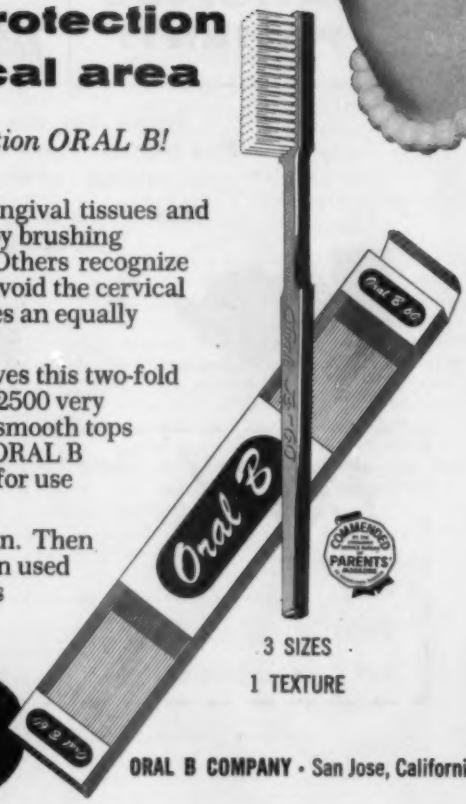

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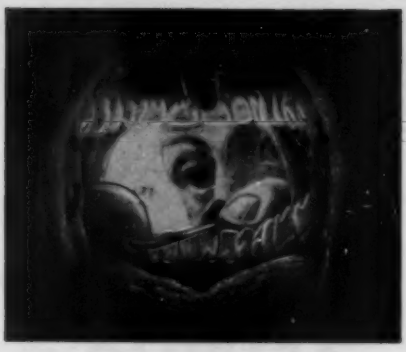

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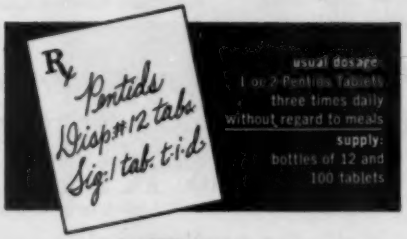

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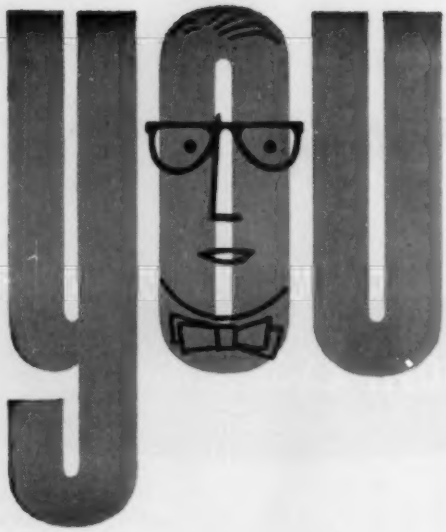

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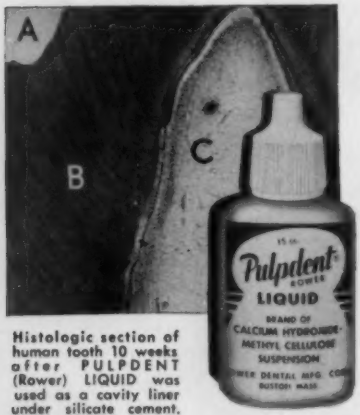

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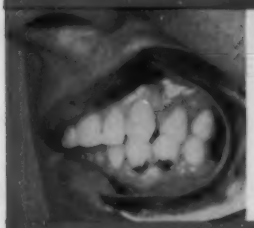

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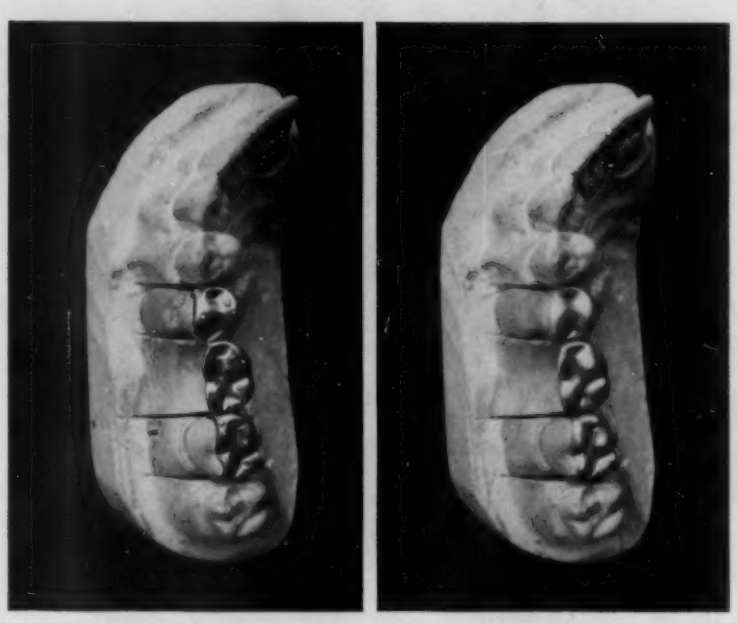

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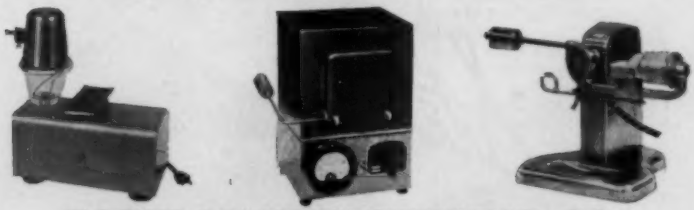

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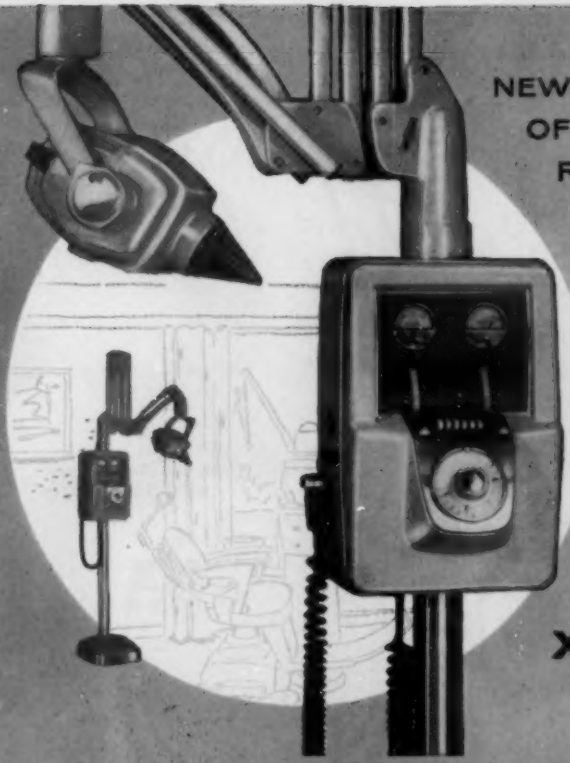

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[Council on Dental Health: J. Am. Dent. A. 47:387 (Oct.) 1953.]

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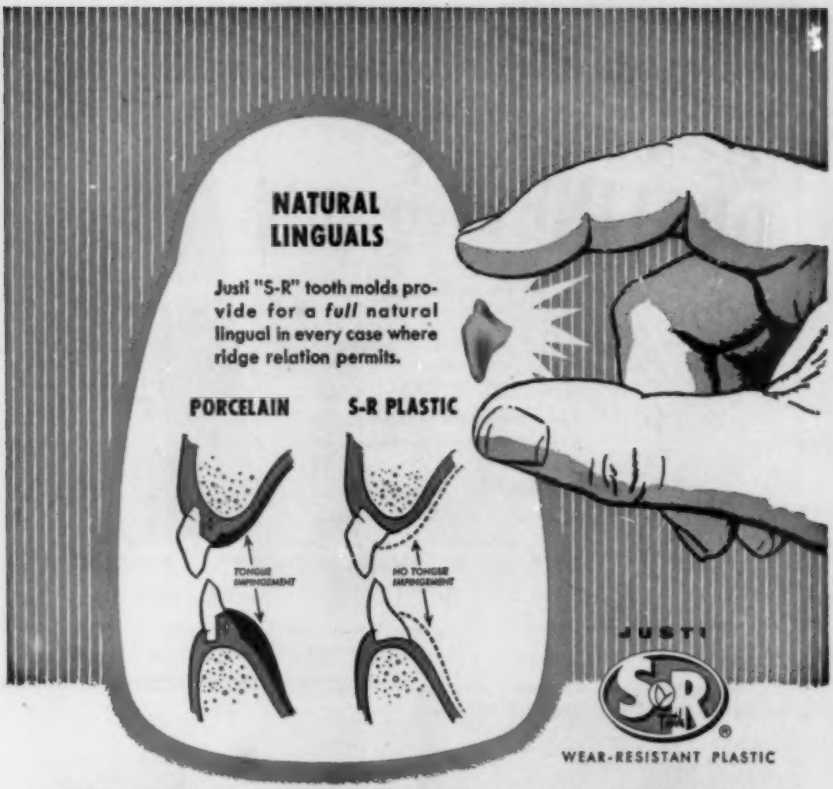

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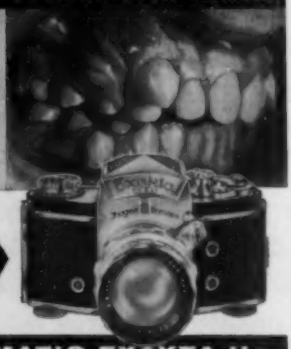

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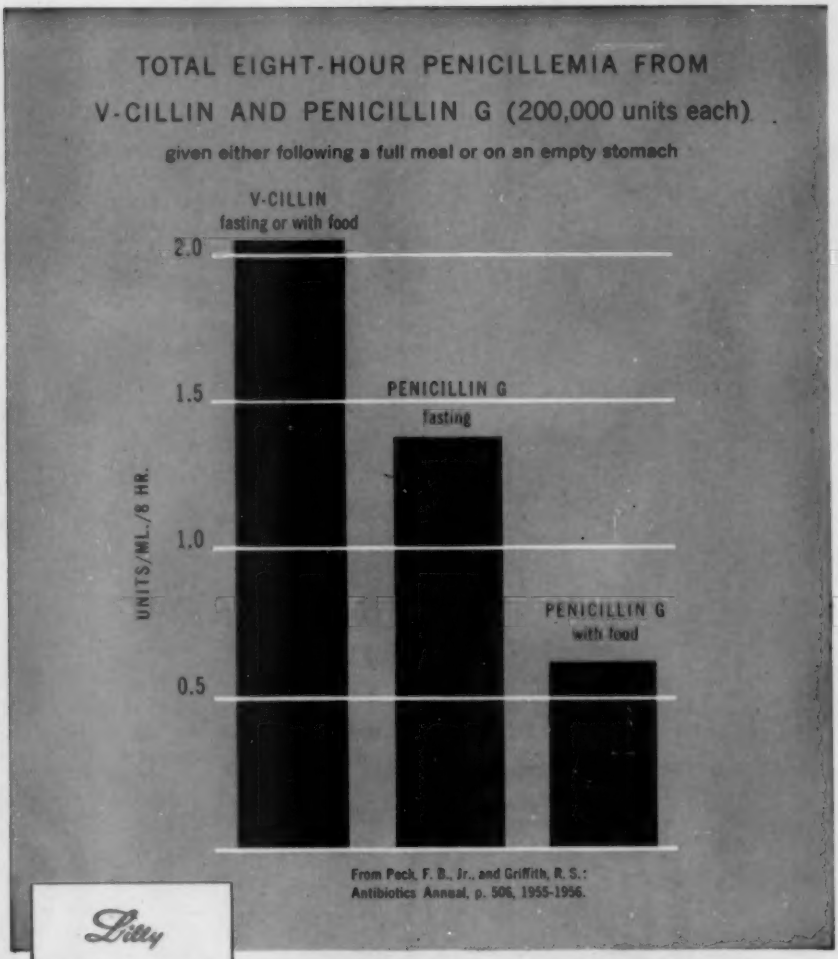

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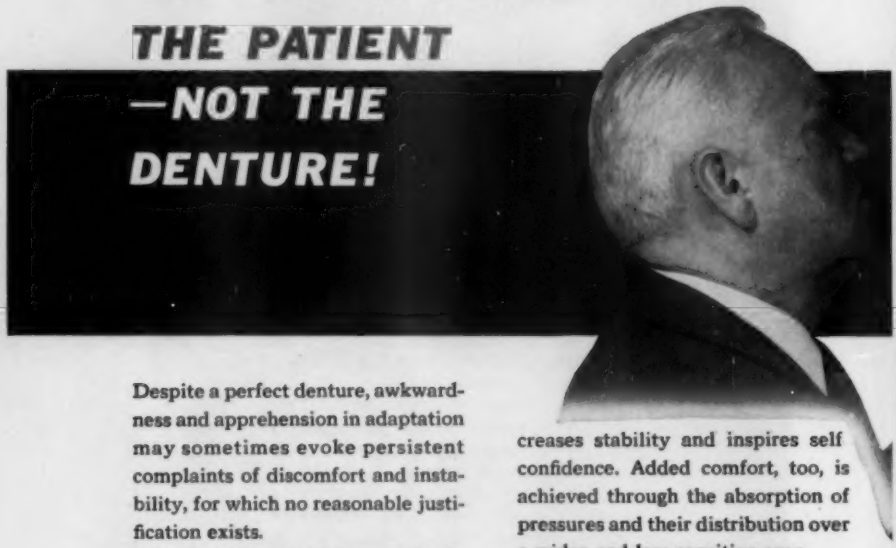

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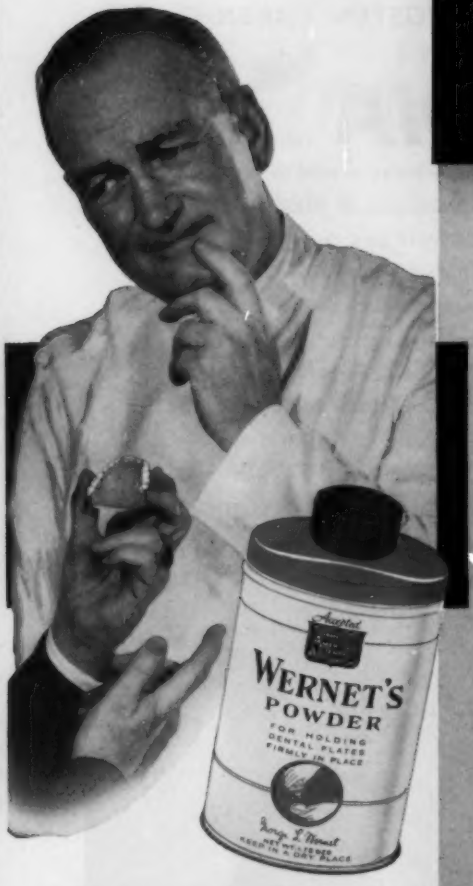

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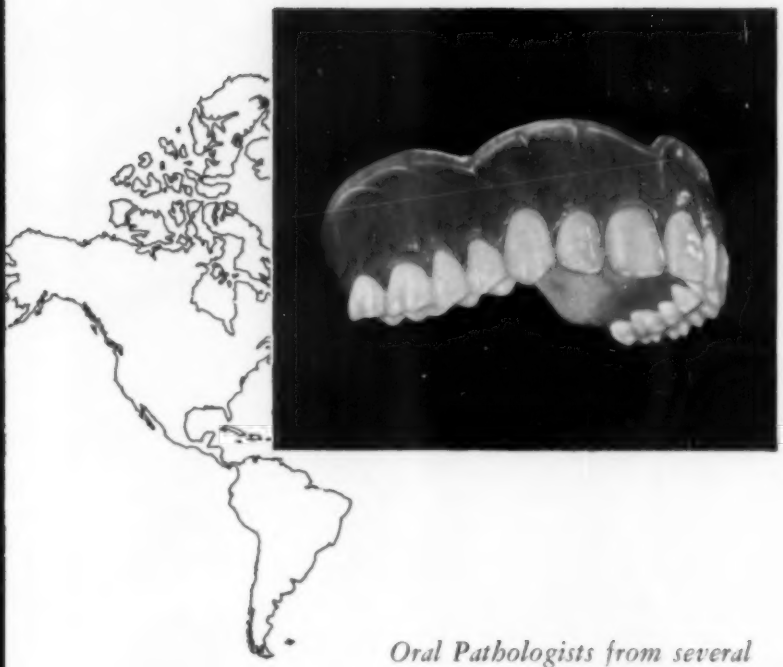

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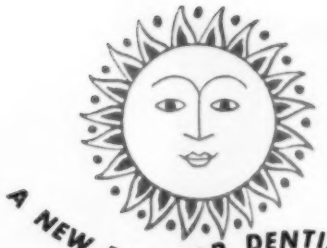

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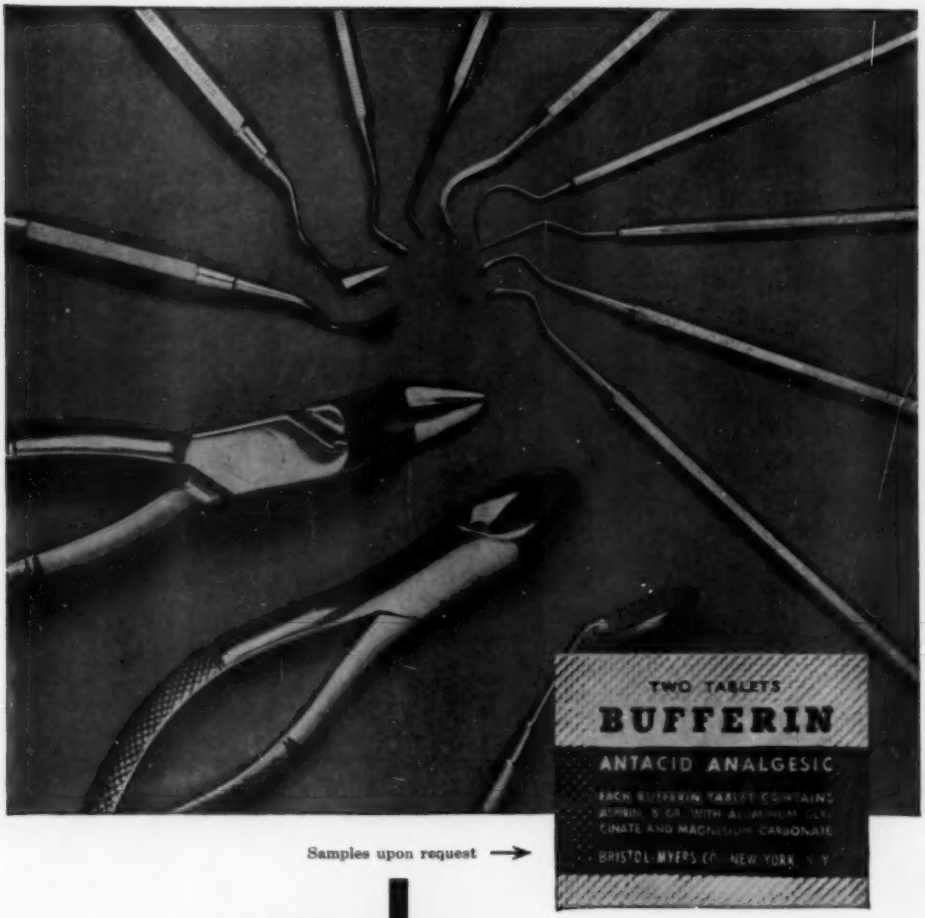

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